COMPUTERWORLD

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NEWSPAPER

Inside: CW Special Report
DDP: Putting the Pieces Together'

PE Tops Off Its 32-Bit Line; 'Memory Scrubber' Feature

By Tim Scannell
CW Staff

OCEANPORT, N.J. — Perkin-Elmer Corp. today unwrapped a high-performance addition to its 32-bit Series 3200 computer line that it claimed is less expensive but 10% to 60% more powerful than Digital Equipment Corp.'s VAX-11/780 and Data General Corp.'s MV/8000.

At the same time, the firm announced what it called the first universal optimizing compiler for the Fortran language (story on Page 6). The compiler more than doubles the performance of the new system and other systems in the 3200 family, according to a PE spokesman.

The Model 3250 introduced today replaces the 3240 as PE's top-of-the-line 32-bit system, leaving three systems in PE's end-user supermini lineup — the 3210, 3230 and 3250. Although it is architecturally similar to the 3240, which was introduced in September 1979, the 3250 has a number of hardware features that are said to boost the system's performance.

For example, the processor incorporates high-density 64K-bit random-access memory chips implemented in 1M- and 2M-byte memory modules. With these modules — which made their debut late last year with the firm's entry-level Model 3210 — a user can configure up to 16M bytes of directly addressable memory in a single cabinet.

In addition, the system contains a built-in "memory scrubber." Essentially an enhanced version of PE's error correcting code, this separate, independent processor locates and corrects memory errors before instructions executing within the CPU can reach the incorrect point in the address space, the spokesman said.

Like its predecessor, the 3250 has a 32-bit parallel architecture and 32-bit memory and data paths. It also has a four-way set-associative 8K-byte cache memory, with a reported hit ratio of 85% to 95%, and 2K words of fixed control store to implement frequently used instructions.

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House Brass Urge Delay on Security Plan

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Eight chairmen of congressional committees have asked the White House to hold off on a plan to increase the kinds of information that government agencies can classify.

The proposed Executive Order on National Security Information could eliminate current restrictions that prevent the government from classifying basic research and privately developed technology not directly related to national security, according to some Capitol Hill and private-sector observers. Because sophisticated electronics technology is likely to become a prime target for expanded government secrecy regulations, one congressional source said recently, the Reagan administration proposal should be particularly worrisome to the DP and telecommunications industries.

The proposed executive order was made available to several House of Representatives committees Feb. 4 with a request for comments by today. The eight chairmen, representing committees on government information, science and technology, foreign affairs, the judiciary and agriculture, said that the comment period was not long enough.

Their response, in a Feb. 10 letter to National Security Adviser William P. Clark, said, "The indicated sched-

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But Currently an Achilles' Heel

IBM Seen Eyeing Communications

By Marcia Blumenthal
CW Staff

NEW YORK — IBM has seen the future and it is communications, according to Howard Anderson, managing director of The Yankee Group.

To maintain its position in the computer industry, IBM must offer users a family of communications-oriented solutions, he maintained, stressing that IBM must become as strong in these products as it has been in processors.

But today, communications is an Achilles' heel for IBM. User acceptance of advanced communications applications, such as electronic mail, has been more rapid than anticipated, Anderson told a large group of executives here last week at the consult-

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Starting Salaries Up 7%, At Record Levels: Survey

By Bruce Hoard
CW Staff

NEW YORK — Overall starting salaries for U.S. DPers are up 7.1% to record levels, and Alaska and Hawaii are the highest paying states, according to the 32nd Robert Half International, Inc. salary survey.

The study is based on analyses of position requests submitted by employers to 75 U.S. Robert Half offices. Some highlights from the survey:

- Project managers at medium-size installations were among those who registered the largest year-to-year gains. They can expect to find starting salaries in the $28,000 to $36,000 range, up 9.3% over 1981.
- Management information systems directors at large installations are now starting at salaries ranging from $45,000 to $65,000, a 7.8% hike over 1981.
- Computer operators have realized a 7.7% jump at small installations, where they are earning $12,000 to $16,000 to start.
- Programmers at medium-size installations are starting at between $16,000 and $20,000, a 7.1% increase over 1981.
- Systems analysts at large

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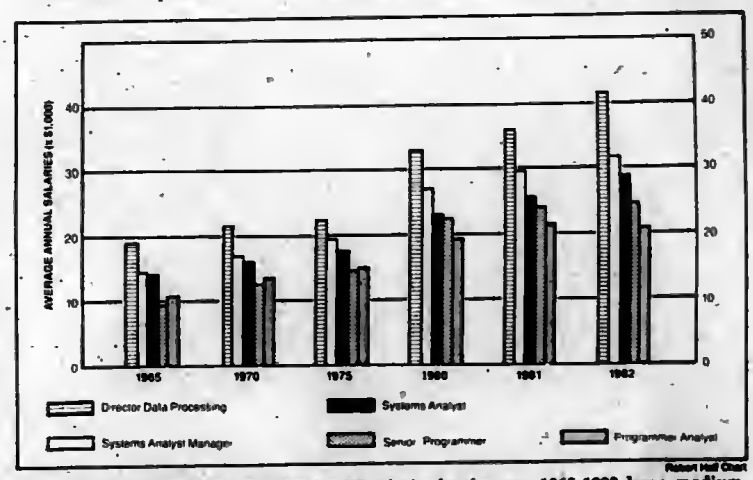

In the chart above showing comparative DP salaries for the years 1965-1982, large, medium and small installations are averaged.

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Some System/34 Prices Also Cut

IBM 34, 38 Get Volume Discounts

By Tom Henkel
CW Staff

RYE, N.Y. — IBM last week announced volume discounts on its System/34 and System/38 processors. The firm also cut purchase prices on the mid-range to upper end of the System/34 line and changed its pricing policies on System/34 and Series/1 software.

The volume discount plan for the System/34 and System/38 offers a 6% discount for purchases of five to nine systems; a 9% discount is available to users who purchase 10 or more systems. To qualify for the plan, a user must agree to accept delivery of all purchased systems within 18 months after the order is placed.

Users cannot mix orders of System/34 and System/38 to qualify for the discount, IBM noted.

The System/34 and System/38 announcement is consistent with similar volume pricing announcements made by IBM for other systems. IBM now offers all but its biggest systems on a volume discount basis.

IBM systems available with volume discounts include the 4300 processors, the 8100 line, System/23 Datamaster, the 5520 administrative system, the 5280 data station, Series/1 processors and the IBM Personal Computer.

System/34 Price Cuts

While announcing the volume discount plan, IBM also cut the price of the mid-range and upper end System/34 processors. Some analysts believe that IBM may be staging a "fire sale" on those processors in preparation for the announcement of a low-end System/38 processor. Others, however, say IBM is simply trying to make the larger System/34 processors more competitive in the marketplace.

The selected System/34 processors, 42 in all, were cut an average of $9,000. The processors now range from $31,690 to $81,625.

IBM has also changed its software pricing policy for the System/34. Monthly charges on the selected program products have been changed to a one-time license fee. Current users of the program products may convert to the one-time charge and receive a credit toward that charge based on the length of time the program has been installed.

One-Time License Fee

System/34 program products that have been switched to a one-time license fee include the 5726-AS1 Basic Assembler and Macro Processor, 5726-BA1 Basic compiler, 5726-CB1 System/34 Cobol, 5726-EM1 SDLC Line Sharing-BSC, 5726-RG1 System/34 RPG and 5726 SS1 System Support Program.

In addition, IBM introduced an upgrade charge for its Series/1 software. The charge, which some analysts say may be the start of a trend, allows users who have paid a one-time license fee for their IBM Program Products to pay an upgrade charge for future releases. The upgrade charge is less expensive than replacing the old package with a new one.

IBM also reduced the one-time charge for most of its Series/1 applications and systems software by 5%.

FCC to Begin Final Consideration Of Some Applications for Dems

WASHINGTON, D.C. — The Federal Communications Commission (FCC) has removed one obstacle blocking the establishment of nationwide end-to-end digital wideband services. Others remain, however, so it will be at least another year — and probably longer — before the first digital electronic message service (Dems) goes on the air, according to an FCC source.

In April 1981, the FCC earmarked seven 5 MHz channel pairs for "extended" Dems serving 30 cities or more. The commission then received 12 applications from potential Dems operators. There was more than one applicant for only two of these channel pairs, however, so earlier this month the FCC said it would begin final consideration of the applications for the five uncontested channels. Several parties have challenged the April 1981 decision on technical and legal grounds. One applicant — Tymnet, Inc. — is opposing the application of another, Insurance Systems of America (ISA), because ISA is a subsidiary of a major independent telephone carrier, United Telecommunications, Inc. According to Tymnet, ISA could compete unfairly.

According to the FCC source, these arguments will have to be settled before the first Dems license is issued.

Significantly, no other vendors have contested ISA's application for a Dems channel pair, while Tymnet's application for a channel pair has been contested.

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DPers Seeking Ways to Manage It

Micro Boom Hits Corporate Managers' Desks

By Robert Batt
CW West Coast Bureau

The number of microcomputers appearing on the desks of senior managers in some of the nation's largest corporations has increased markedly in the last 12 months.

Following a successful pilot project, Ford Motor Co.'a Systems Office Department in Dearborn, Mich., installed 100 personal computers — most of them Radio Shack TRS-80 Model IIs — during the past year. Corporations like General Electric Co. and North American Philips Corp., a subsidiary of the Dutch conglomerate, have also reported rapid growth in the use of micros.

GE, in fact, has established a personal computer program for DP professionals to help them provide assistance to end users. The technical staff's functions include meeting with vendors and evaluating products, issuing guidelines to department heads and assisting with running the computer.

"We are seeing a lot of interest from people who have not had a lot of experience with computers," Jeff Ehrlich, GE's manager of applications technology, reported. "There is a lot of confusion about what is being offered by different vendors and we act as a kind of clearinghouse."

The entry of major mainframe and minicomputer vendors — IBM, Hewlett-Packard Co. and Xerox Corp., for example — into the personal computer field seems to be a major factor in the proliferation of microcomputers in big business.

This development, analysts said, has caught senior managers' attention and made them curious about the potential of microcomputer technology.

Different Approaches

The microcomputer ers is being approached in different ways by various firms. North American Philips, for example, has adopted an integrated, decentralized approach in line with the company's philosophy of distributed data processing (DDP).

"The main thrust of what we are doing is to be able to tie a hierarchy of maxi-, mini- and microcomputers so that they are able to use the same data base," explained Chuck Ferguson, corporate vice-president.

The company is aiming to achieve both horizontal and vertical integration, linking its IBM 3033s and 4331s and Apple Computer, Inc., Radio Shack and IBM personal computers. The mainframes continue to manipulate large data files while the micros enable such applications as inventory analysis to be executed at the managers' desks.

"People tend to like the micro logic," Ferguson said. "There is something about using a personal computer which makes people feel they are using their own tool."

Other organizations are adopting a more cautious approach to this new technology. At Ford, for example, personal computers are used in stand-alone mode with the Visicalc package from Visicorp. The strategy is to keep applications in a local mode, isolated from the potential problems of on-line use.

"With these powerful and inexpensive machines, you can dispense power greatly. The personal computer can be completely insulated from the problem of running, say, a communicationa system," according to Ted Danielson, manager of the Finance and Staff Systems Department.

Even in this restricted mode, Ford has found that big savings can be achieved with the proliferation of personal computing power.

After conducting a study among the new microcomputer users, the auto maker discovered not only an enthusiastic user response, but also annual average savings greater than the original cost of the 100 micros. That meant a pay back on the investment within the first year.

Other companies, like GE, have chosen a middle ground. Personal computers are employed on a stand-alone basis for applications such as financial analysis and spread-sheet uses, presentationa and plotting. At the same time, the micro has access to a remote computer.

But "at this point, there is no formal distributed processing strategy," Ehrlich said. "For the near term, the approach will be more ad hoc since networking is not quite here yet. Nevertheless, these machines should very quickly pay for themselves."

Limiting Factor

This is not to say there will not be problems. The pace of software development is clearly a limiting factor. According to Danielson, micro software is not yet able to support a first-rate distributed system.

In addition, personal computer systems are still fairly technical, according to Ehrlich. One must wade through a manual — an action that is anathema to the user who is not technically oriented.

Nevertheless, the potential for progress is there. The user base within companies like North American would have seemed inconceivable only a short while ago.

This has changed some managerial relationships. For example, one North American Philips vice-president currently performs much of his own analysis rather than sending requests for information to his staff.

What About Your Company?

Success or sob story? If your DP shop's domain includes microcomputers — either within the shop itself or out on your end users' desks — *Computerworld* would like to hear from you. CW is looking for manuscripts (even letters are fine) outlining your experiences attaching microcomputers to minicomputers or mainframes. We want to hear about both the benefits and pitfalls of using micros in a DP operation.

Material should be submitted by March 1 to Tom Henkel, Writer/Analyst, *Computerworld*, 375 Cochituate Road, P.O. Box 880, Framingham, Mass. 01701.

Micros Also Put to Work in Some DP Shops

By Robert Batt
CW West Coast Bureau

PALO ALTO, Calif. — As increasing numbers of microcomputers appear on the desks of senior managers in large corporations, the DP shop itself may accrue substantial benefits from this trend.

Some shops are already using microcomputers to carry out such applications as budgeting and forecasting, inventory control and cash management. However, Chuck Ferguson, corporate vice-president of North American Philips Corp., cautioned that "the 1980s can be the greatest time in technological history — or the biggest mess, if what you develop are rival data bases and islands of technology."

According to Ferguson, an integrated, decentralized approach to microcomputing, with the DP department at the heart, is the key to exploiting this new technology's real potential.

One technology that could have an enormous bearing on this development is that of local-area networks. "What would be useful is some capability by which the personal computer could tie into existing office automation systems and operate in an integrated manner," Jeff Ehrlich, manager of applications technology at the General Electric Co., explained.

Even though this type of development is in the planning stage, there are several ways that DPers accustomed to number-crunching on big mainframes can use personal computers. As one management information systems manager put it, "Given the rate at which the technology is advancing, it will soon become possible to have a micro with the power of an IBM 370. It would be foolish for us to ignore this fact of life."

Among the uses to which a micro might be put in the DP shop are:

- Maintaining production schedules. This could involve logging and prioritizing user requests for system programming time. Personal computers could also be utilized in this capacity to assess projects in terms of programmer time and to schedule the staffing requirements of the DP department. Electronic spread sheets would allow such applications to be performed more quickly and to be updated more easily than is possible with traditional manual methods, claimed Gib Hoxie, president of Context Management Systems, Inc., a Torrance, Calif.-based micro software vendor.

The typical DP department of a large organization might be dealing with 200 projects at any one time, according to Hoxie. If conditions change and an emergency job has to be performed, it has a "cascading effect" on the department, he said.

Without personal computers, schedules cannot be easily adjusted. The result is that the whole work program is thrown off synch.

- Tracking inventories. With micros, Hoxie argued, a simple inventory tracking system can be installed that is particularly useful for small and medium-size DP shops.
- Analyzing costs and cash flow to assess the potential benefits of a project against its estimated costs.
- Maintaining tape and disk libraries.

Little Awareness

Despite these possible benefits, there does not yet seem to be a strong awareness of the potential of personal computers as a tool for DPers themselves.

"We tend to use personal computers to maintain communications links with the user department or to help the users with their applications problems, rather than for the personal benefit of the DP department," Ehrlich admitted.

Within his organization, the DP technical staff tends to use the micro for processing jobs of a specialized nature. The communications area might be one example, according to Ehrlich.

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Don't Limit AT&T, NTIA Chief Tells House

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — The Reagan administration's chief telecommunications adviser told Congress last week that pending legislation should not restrict AT&T's services. Reason: the proposed divestiture of the Bell operating companies removes the ability of the undivested remainder to compete unfairly.

Bernard J. Wunder, who heads the National Telecommunications and Information Administration, appeared at a hearing convened by the House of Representatives Telecommunications Subcommittee, which has drafted a bill (H.R. 5158) that limits AT&T's offering of competitive services in several ways.

However, these provisions were written before Justice Department and AT&T lawyers buried the hatchet in the U.S. vs. AT&T antitrust suit early last month by negotiating a proposed consent decree.

The subcommittee — or at least its Democratic majority — now appears to feel that the Bell operating companies' activities should not be restricted, while those of AT&T's undivested Long Lines Division should be.

In previous hearings, the subcommittee's position has been endorsed by spokesmen for data communications user groups as well as by officials of state public utilities commissions. The users fear that without restrictions, AT&T will be able to manipulate rates for long-distance services, deny interconnection to private networks and hinder competing suppliers of on-line terminals and services.

Wunder, however, said the Reagan administration strongly opposes "any legislation seeking to further restructure AT&T at this time" — specifically, "legislation aimed at curtailing or preventing AT&T's participation in the so-called 'information services' field. These, for the most part, are new services and there's no record of any competitive abuses. Most people agree that these new services, if they develop competitively, could . . . offer consumers broader choices."

He also indicated that divestiture of the Bell operating companies will eliminate any need to restructure the manufacturing activities of the undivested Western Electric Co., despite fears expressed by members of the telecommunications subcommittee, users and others that Long Lines revenues could enable Western Electric to sell terminals, modems and related equipment at below-cost prices.

Head of NTIA Also at Odds On BOC Limits

WASHINGTON, D.C. — The issue of whether the charter of the to-be-divested Bell operating companies (BOC) should be expanded put President Reagan's chief telecommunications adviser at odds with the majority of the House of Representatives' Telecommunications Subcommittee in hearings here last week.

"The administration would oppose legislation dealing with restrictions on the new service offerings of the divested local-exchange companies or interfering with those restrictions now in the proposed [Justice Department/AT&T consent] decree," said Bernard J. Wunder, head of the National Telecommunications and Information Administration.

This is one of several changes which should not be made, Wunder explained, "pending completion of the court proceedings surrounding the proposed [U.S. vs. AT&T] settlement that are now under way. The administration, in short, feels strongly that . . . Congress should wait until the dust settles."

The restrictions in the sgreement negotiated by Justice Department and AT&T attorneys limit the Bell operating companies to regulated local-exchange and exchange access services. The main reason for expanding this charter would be to offset the loss of money-making opportunities that the Bell operating companies will suffer from divestiture. They are slated to lose revenue now being earned from such activities as Yellow Pages advertising, rental of terminal equipment and provision of intrastate toll services.

At last week's hearing, the idea of expanding the charter of the Bell operating companies was endorsed by Mark Fowler, chairman of the Federal Communications Commission (FCC), and commission member Joseph Fogarty. Said Fowler, "The FCC is not convinced that the new local-exchange carriers . . . must forever . . . be limited to the offering of regulated service . . . New technologies are developing." The settlement between the Justice Department and AT&T, he added, should provide a mechanism that would "reexamine at regular times whether the prohibitions on [Bell operating companies'] competitive activity . . . are warranted and . . . eliminate any restrictions on the Bell operating companies which are no longer justified."

Fogarty was even more specific. He said that sfter divestiture the Bell operating companies should be treated as "independent telephone companies" and allowed to offer the same services.

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PE 3200s Gain Fortran Optimizing Compiler

By Tim Scannell
CW Staff

OCEANPORT, N.J. — Perkin-Elmer Corp. announced today a universal optimizing language compiler for its 32-bit Series 3200 superminis that is said to double system performance by increasing the execution speeds of Fortran applications.

Fortran VII Z, which PE claimed is the industry's first universal optimizer, supports the full Ansi X3.9-1978 standard. Fortran compilers previously were limited to global optimization — defined as optimizing individual modules — rather than across-the-board program enhancement, a PE spokesman stated.

Universal optimization differs from global optimization in that it allows the compiler to "see" across module boundaries, reportedly eliminating call overheads and optimizing subprograms in context. Global optimizers work with each subprogram individually. When these subprograms are compiled there is no way for global optimizers to determine how the module will be used within the entire program scheme, the spokesman explained.

Programs aided by Fortran VII Z reportedly outperform their globally optimized equivalents by a factor of up to four, depending on the complexity of the user's program.

For instance, in single-precision Whetstone tests conducted by PE, the Model 3210 performed at a rate of about 1,100 instruction/sec while the 3230 was clocked at 1,400 instruction/sec. These figures compare with Whetstone values of about 600 and 700, respectively.

The 3250, which PE introduced today, received a Whetstone rating of 3,038 instruction/sec, an instruction execution rate said to be more than 2.5 times faster than the machine without the universal optimizer.

In addition, a PE spokesman claimed, programmers can easily create and debug highly structured Fortran and use Fortran subprograms in the same way an assembler programmer uses macros.

When Fortran VII Z is used, inefficiencies of a program are reportedly eliminated by the compiler, increasing programmer productivity and maximizing the power of the computer system.

The universal language optimizer also includes a development facility that is said to let programs be compiled at speeds exceeding 3,000 line/min directly into linkable object code, the spokesman added.

Fortran VII programs can run under the firm's OS/32 MTM time-sharing monitor or directly under the OS/32 operating system in real-time or number-crunching applications.

The compiler costs $24,950 per license and will be available this May from the vendor, located at 2 Crescent Place, Oceanport, N.J. 07757.

PE Adds High-Performance 32-Bit CPU

Characteristics \ System	Perkin-Elmer Corp. Model 3210	Perkin-Elmer Corp. Model 3230	Perkin-Elmer Corp. Model 3250
Relative Performance[1]	50	53	233[3]
Mips[2]	.93	.96	4.1[3]
Memory Size in bytes (Min-Max)	512K-4M	512K-8M	512K-16M
Purchase Price (Memory Size)	$49,900[4] (512K)	$65,800[4] (512K)	$190,900[5] (2M)
Lease Price (Lease Term)	None	None	None
Machine Cycle Time (Nsec)	250	250	250
Channels (Min-Max)	7	8	32
Cache (Buffer) Size	None	1K	8K
Bus Architecture?	Yes	Yes	Yes
Price per 1M Byte of Main Memory	$15,900 $25,900 (2M)	$23,900	$15,900 $25,900 (2M)

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM System 370/158-3 equating 45. These numbers are designed to put the processor into perspective with other systems. It is not a buyer's guide. All systems are not alike. They use different operating systems, instruction sets and architectures, and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.
2. CW estimates.
3. Performance figures arrived at using PE's optional Fortran VII Z universal optimizing compiler. Figures without compiler may be up to 60% less, depending on user application.
4. Includes system console, power supply with battery backup, 27M-byte cartridge disk drive, selector channel and disk controller.
5. Price includes processor, terminal console, 80M-byte disk drive, dual-density tape drive, floating point processor, power supply with backup and 10 communications lines. Fortran VII Z can be licensed for a one-time fee of $24,950.

(Continued from Page 1)

The 3250 offers one to four direct memory access (DMA) buses and a multiplexer bus. The DMA buses handle high-speed devices such as magnetic tapes and disk drives, while the multiplexer bus manages slow to medium-speed peripherals like printers, the spokesman explained.

The DMA bus can support up to 10M byte/sec of I/O throughput, providing a total throughput capability of up to 40M byte/sec, he noted. All of this is distributed over the processor's 32 channels.

Options for the 3250 include a floating-point processor for single- and double-precision floating-point operations and 2K words of writable control store, which can be used to implement mathematical or scientific algorithms.

The 3250 can utilize PE's full line of 32-bit software, including the OS/32 operating system, the Reliance transaction processing system, Cobol, RPG-II, Basic II and Pascal.

A 3250 processor with 2M bytes of memory costs $150,000. However, a typical system with 2M bytes of memory, a Model 550B terminal, an 80M-byte disk drive, a dual-density tape drive, floating-point processor, battery backup, loader storage unit and 10 communications lines sells for $190,900.

Deliveries of the system are scheduled to begin this month.

Present 3210 and 3230 users can upgrade to the 3250. PE's upgrade policy allows a customer to keep 75% or more of the original investment and receive about a 25% credit for a returned processor, the spokesman noted. Additional information on the 3250 and other Series 3200 processors and software can be obtained from PE at 2 Crescent Place, Oceanport, N.J. 07757.

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Corrections

The correct address of Seagate Technology, Inc. ["Seagate Announces Micro-Winchester," CW, Feb. 1] is 360 El Pueblo Road, Scotts Valley, Calif. 95066.

The correct address of Applied Digital Data Systems, Inc. ["Adds Offers CRT Terminal," CW, Jan. 18] is 100 Marcus Blvd., Hauppauge, N.Y. 11787.

Starting Salaries Up 7%: Survey

(Continued from Page 1)

installations will find salaries in the $28,000 to $36,000 range, a 3.2% gain.

Half noted that its figures are national averages and that geographic variances should be applied to all salaries of $50,000 or less. If a position paying up to $50,000 is located in a city with a population of one million or more, an additional 5% should be added to the prevailing starting salary, the firm noted.

As examples, starting salaries in Connecticut, California and Nevada are 5% higher than the national average, while figures from Florida, Maine, North Carolina and New Mexico indicated those states were 8% to 10% below the national average, according to the survey.

Bolstered by 18% and 12% increases in Alaska and Hawaii, respectively, the Far West was the most bullish region, with only Oregon showing negative growth at -2%. California (up 5%), Nevada (5%) and Washington (2%) round out that geographical group.

Every state in the Southeast registered negative figures. Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Virginia and West Virginia were all down, with Mississippi tying Maine for the lowest negative growth in the country at -10%.

In ascertaining installation size, the firm took into account a combination of hardware (CPU size only) and the professional staff (management, analysts, programmers). A large installation was judged to have a staff of 50; a medium organization, 15 to 49; and a small organization, under 15, the firm said.

Other DP groups that fared well in the 1981-82 time frame include technical support managers, who moved up 9.9% to the $33,000 to $45,000 range; and telecommunications managers, who registered 8.9% starting salary increases, moving into the $28,000 to $33,000 category.

The results of the survey are available free from Robert Half international, Inc., 522 Fifth Ave., New York, N.Y. 10036.

Delay Requested On Security Plan

(Continued from Page 1)

ule for congressional consideration of the draft executive order is too short. More time should be allowed for study."

The letter, initiated by Rep. Glenn English (D-Okla.), chairman of the House Government Information and Individual Rights Subcommittee, said: "The classification of national security information is an important issue of broad general interest. The classification rules affect not only the executive branch and the Congress but also the scientific, industrial, research and academic communities. No change should be made . . . without allowing for thorough review."

The proposed order is an attempt by the Reagan administration to clarify and tighten existing classification regulations, set out in a 1978 order by then-President Carter. While not significantly different from the Carter order in the management and targeting of security classification efforts, the Reagan draft is considerably different in its increased emphasis on secrecy.

The proposal says, in effect, "when in doubt, classify," whereas the Carter regulations were more slanted toward government openness.

What most worries congressional and private-sector observers about the Reagan proposal is its new classification categories, which might, some say, lead to increased classification of information by the government and perhaps to government attempts to clamp a secrecy lid on nongovernment information. The proposal calls for a new classification category for cryptology and directs the Department of Defense to develop special procedures for the review of cryptology information. It also would establish a new secrecy classification for information concerning "the vulnerabilities or capabilities of systems, installations, projects or plans relating to the national security."

Uncertainty Cited

The uncertainty about exactly what the new categories would embrace is apparently a major reason the eight congressional chairmen feel the proposed changes in the government's classification mechanisms should be given an in-depth review.

The inclusion of new technical information categories is not in itself a radical departure from the existing secrecy regulations, which contain a provision for classifying "scientific, technological or economic matters relating to the national security." But, according to one congressional aide, the proposed plan's "definition of information is not entirely clear." The Reagan order defines classifiable information as "data owned by, produced by, produced for or under the control of the U.S. Government."

The aide noted, however, that many types of systems, including hardware, software and telecommunications facilities, are used by both the defense establishment and the private sector. A broad range of technological data "arguably is classifiable under this broad [systems, installations, projects and plans] category," he said.

User Charges Wang Used Obsolete Parts

By Tim Scannell
CW Staff

NANTUCKET, Mass. — Wang Laboratories, Inc. allegedly used obsolete parts to build a computer system purchased more than three years ago by The Albert G. Brock Co., Inc., an insurance firm here. That charge was made in a report filed in a Nantucket court by Brock, which brought suit against Wang in 1979, charging the company with negligence, selling defective equipment and breach of implied warranties [CW, Feb. 1].

A Wang spokesman contacted last week refused to comment on either the charge or the lawsuit. "We don't believe that litigation should be conducted in the press," Michael Sullivan said. "We have many satisfied customers, but, naturally, a percentage of them are going to be unhappy."

'Very Inadequate' Services

Brock's report — which included technical analyses from Solotest, Inc., an independent testing firm, and Northeast Digital Services, a service firm in Pennsylvania — charges that Wang provided services that were "very inadequate," performed unnecessary adjustments to Brock's computer system and failed to keep accurate maintenance records, according to Gerald Abrams, the insurance firm's attorney.

The report was filed Feb. 11 as an answer to interrogatories posed by Wang in reference to the case, he said.

In its suit against Wang, Brock claimed that after more than two years of service calls, Wang was reportedly unable to locate and repair what it called a relatively simple hardware problem in its Wang 2200T system, purchased in 1977. The problem was later traced to the read-only memory boards in the computer's disk controller and reportedly repaired by Northeast Digital Services.

At press time no date had been set for a hearing on the case.

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Because of Rising Costs

User Turn to Networking Applications Forecast

By Marcia Blumenthal
CW Staff

NEW YORK — A projected 10% to 15% increase in communications costs through 1985 means that users will find networking applications on distributed processors increasingly effective, according to Dale Kutnick, director of research for The Yankee Group.

By 1985, Kutnick predicted here last week, about 56% of the dispersed processing market will be for networking applications. "Networking" in this case means transparent access to computing power and data bases, he told 150 executives attending a Yankee Group conference on "The Future of IBM."

Although IBM has yet to establish itself solidly in the distributed data processing (DDP) arena, it will begin to use networking aspects of its Systems Network Architecture (SNA) vigorously to drive out minicomputer competitors, Kutnick said. Mini makers have gained user acceptance by marketing their systems as applications nodes in a DDP network.

IBM has already started to make it difficult for mini vendors to support its Remote Operator Control Facility and be compatible with SNA, he claimed.

By the middle of this decade, 60% of large IBM sites will use SNA, Kutnick estimated, and the battle for market share during the decade will be fought at the satellite processor level. "If you get to sell this processor, you also get first crack at peripheral sales," he explained.

The function of the host will change during this time frame, becoming a data base processor, a network controller, a software development tool and a batch processor, he forecast.

Competition will also heat up at the front-end processor level, Kutnick predicted, and it is at that node that AT&T is going to try to cut IBM off. "Don't be surprised if you see a 32-bit mini from AT&T that runs Unix."

Vendors with products that serve as gateways to networks will be well received by users, he added.

Although IBM has yet to make a substantial foray into DDP, it has several systems that offer users front-end and/or satellite processing capability needed for dispersed networks. In particular, Kutnick pointed to the Series/1, System/34, System/38, 4300, 8100 and 5280 products.

IBM will make program files transferable for those systems incompatible with its-370 architecture, Kutnick forecast. Moreover, he suggested that in order to reduce communications costs, it would be advantageous for IBM to develop software that would disperse portions of data bases to satellite processors and contain updating capability.

Communications Future Stressed for IBM

(Continued from Page 1)

group's two-day conference on the future of IBM.

To date, IBM's major communications offering has been Satellite Business Systems (SBS), a joint venture with Comsat General Corp. and Aetna Life and Casualty Co., which Anderson maintained has not really gotten off the ground as far as data communications is concerned.

Noting that the venture is undercapitalized, Anderson predicted IBM would probably not jump into joint ventures again. SBS' 25 or so users today are using the service primarily for voice communications, he said.

IBM's policy is "never let anything get between you and your customer," Anderson stressed. And if data communications is a local business, then IBM must solve that problem, he said. Some 50% to 60% of data communications is of a local nature. Higher communications costs on the local level will hamper new DP applications, eventually putting a cramp on new equipment purchases, a situation IBM finds intolerable, Anderson explained.

To ward off the likes of AT&T on the local scene, IBM must be willing to integrate backward into communications transmission to reduce users' costs for local data distribution. Moreover, the company must be able to offer a networking solution.

In addition, Anderson said he would not be surprised to see IBM create a cable company for the dissemination of voice, data and visual information or private microwave or cellular radio networks.

While in the past IBM has been fixated on profit and loss results for specific products, it now has the needed return on investment from strong portions of the company that will permit it to invest in new markets, Anderson said. This exploration of new markets is in keeping with a more entrepreneurial focus emerging at IBM.

Major Weakness

IBM's size has been a major weakness for the firm, Anderson maintained. Because of its product, rather than market, orientation, IBM did not venture into new markets like personal computers until it reached the $1 billion annual revenue size.

However, in the past two years about $1 billion in venture capital has been invested annually in these new markets, with many of IBM's most capable managers being siphoned off to manage these emerging firms. IBM can no longer afford to lose its managerial talent, Anderson said.

Besides its weakness in communications and constraints due to its size, IBM has been weak in distributed data processing (see related story) and has resisted new distribution techniques needed for selling low-cost products.

To cope with its weaknesses, IBM has evolved some new strategies, a key one being reorganizing around its 2,400 large national accounts to which it will sell complete solutions.

Moreover, with capital investment of about $29 billion, IBM will not build plant capacity before it is needed to thwart competitors whose products have quick delivery schedules. Peripheral suppliers have been quick to reap the benefits of IBM's slow shipping schedule.

Coincidental with its plan to improve its manufacturing capacity, IBM will leverage its technology, making its products fit the needs of many user levels. A prime example of this is the expansion of the 4300 line from mini-mainframe to small business system proportions, Yankee Group analysts pointed out.

PUC Asks FCC To Reconsider

WASHINGTON, D.C. — The California Public Utilities Commission (PUC) has requested that the Federal Communications Commission (FCC) reconsider the decision it made last December that telephone operating companies could not impose local access surcharges on interstate private line users without getting the commission's prior approval.

Even though only three carriers (Rochester Telephone Co., New York Telephone Co. and Pacific Telephone and Telegraph Co.) were affected directly by the FCC decision, it was a significant ruling because several other operating companies reportedly were on the verge of imposing similar surcharges, which ranged as high as $63.50/line/mo.

In its reconsideration request, the PUC pointed out that the recently proposed divestiture of AT&T's operating companies will sock residential users with substantially higher rates and indicated the surcharge might soften the blow because it is imposed on business users of the telephone network.

Moreover, the PUC said the FCC's assertion of jurisdiction "is more easily justified when the bulk of the nation's communications net is operated . . . by a parent and its integrated subsidiaries rather than by independent companies. Where the local exchange company is independent of the interstate carrier, its rates and charges take on a more local character."

This latter point is a major bone of contention in Washington at the moment. Both rewrites of the Communications Act of 1934 now pending in Congress (S. 858 and H.R. 5138) transfer jurisdiction over intrastate toll services from the states to the federal government, and the AT&T-Justice Department agreement transfers the related facilities from Bell operating companies to AT&T's Long Lines Division.

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The Used Computer Market: It's Only For Those

By Tom Henkel
CW Staff

Are there any classic computers — of just old ones? For those who have tried to buy or sell a used processor, the answer usually comes up "both."

The used computer market differs markedly from its retail counterpart. In some cases, it is less expensive to buy hardware in the used computer market than to buy from an OEM. In other cases, users may be willing to pay the used computer seller a premium for fast delivery. For other users, this market provides the only place to buy equipment that is no longer made or supported by the OEM.

For whatever reason a user ventures into the used computer arena, vendors of used hardware agree that tha market is not for everyone. Tha user must know exactly what ha wants and exactly how much he is willing to pay for it.

In the retail market, for example, the salesman can be a big help in configuring a new system. That luxury is seldom present in the used market. The user buying from a private seller is on his own. Used computer firms will sometimes offer advice. However, it is rarely as extensive as that offered by the OEM. In fact, many used computer firms either discourage or flatly refuse to sell to novice users.

The used market also reacts differently to economic conditions. Longtima used computer dealer Sonny Monosson, chairman of Boston's American Used Computer Group, said the used market is healthy in both good and bad economic times, but suffers in times of stability.

Monosson explained that the used market is good during prosperous times because OEMs get bogged down with orders and delivery schedules are long. The market is popular in bad economic times because slashed budgets mean users oftan cannot afford tha new hardware they need. In stable times, he contended, neithar extreme exists, hance the used market slumps.

IBM hardware is the biggest seller in the used computer market. Monosson, who deals primarily with Digital Equipment Corp. hardware, estimated that IBM hardware makes up about 90% of the markat. DEC comes in a distant second.

Hot Items

In the IBM market, peripherals are the biggest sellers, according to Svend Hartmann, president of Computer Merchants, Inc. Peripherals that can be used with IBM 370 and 3033 processers, such as 3350 disk drives, 3420 tape units, 3278 terminals and 370-compatible controllers are hot items, Hartmann said.

While there is atill a market for older IBM hardware, Hartmann maintained that certain of the older machines are not very popular. The 370/158 and 168, for exampla, do not sell well because the cost of IBM maintenance is high and installation costs can run as much as $100,000.

For that money, Hartmann contended, it is cheaper for users to buy a 4341 processor that offers a better price/performance ratio.

More popular items include current IBM products lika the System/34 and the 4331-2, 4341-1 and 4341-2 processors, Hartmann said.

Now that IBM has eliminated the 4331-1 processor from its new production product line, Hartmann said that it might becoma a hot seller. Tha smallest 4331 Model J1 processor, for example, sells for around $60,000 on the used market. That is cheaper than the 4331-1 replacement, the 4321, which costs around $115,000, Hartmann said. The 4331 does not support the newly announced VM/SSX (Small Systems Executive) operating system, however.

Unlike the used market for other vendors' hardware, the used IBM market tends to attract bargain hunters, Hartmann said.

"Small business users looking for bargains [while] not knowing what they need can be pretty dangerous,"

(Continued on Page 11)

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Dealers Group Adopts Ethics Code

VAIL, Colo. — Faced with a growing number of used computer dealars, the American Society of Computer Dealers recently adopted a code of athics for its mambers to follow.

Included in tha six-article code are promises to keep all information about cliants confidential, to follow through with all verbal commitments, to negotiate used computer daals under ona company name (as opposed to several) and to explain all the conditions of tha sale to tha user before the contract is signed.

The code of ethics was approved by 30 members of the 32-member organization. Violation of the code can lead to probation or expulsion from tha group, according to a spokesman. Tha American Society of Computer Dealers is headquartered at 3500 Southfield Center, Dallas, Texas 75201.

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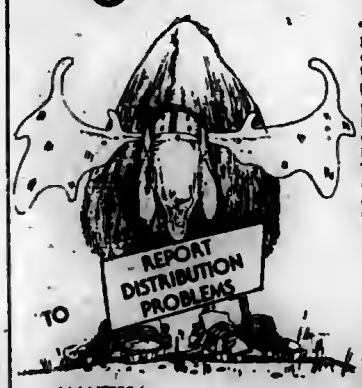

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HP Group to Sell Used 3000 Series

SUNNYVALE, Calif. — Hewlett-Packard Co. has established a division to sell used HP 3000 series processors.

Called the HP Systems Re-Marketing Operation, the division officially starts operation today. It is headed by David E. Sanders, formerly product marketing manager for the HP Computer Marketing Group.

"Remarketed products are refurbished, warranted, installed and supported by Hewlett-Packard as if new," Sanders noted.

Initially the organization will market only HP 3000 processers. Sanders said users can save about 15% off the price of a new machine. The firm listed the HP 3000 Series 30R processor as an example. The processor costs $39,490 including processor, 512K bytes of memory, disk and tape drives. Although currently out of new production, the same configuration costs $70,275 new, HP said.

Who Know Exactly Which CPU They Want

(Continued from Page 10)

Hartmann warned. He added that users often buy one system and quickly find out they have purchased too little processing power or that the software available on those machines is not suited to their needs.

Monosson, sometimes faced with a similar situation for used DEC equipment, prefers not to sell to new users. Instead, the Boston-based dealer suggested that a user rent a system for about a year to determine whether it really suits his needs.

The used DEC market ranks a distant second to the IBM market, according to many dealers. Monosson said users seeking DEC hardware take one of two forms. There are users who want additional PDP-11 and VAX processors. The PDP-11/70 line, the PDP-11/34A and VAX-11/70 are popular requests.

However, there is also a market for older DEC hardware. Unlike IBM, which offers support for virtually every piece of hardware it has ever made, Monosson claimed that DEC stops supporting older hardware. Hence, parts become hard to find. That creates a large market for pieces of older DEC systems, according to Monosson.

Most Popular Systems

The most popular DEC systems, according to Al Newman, president of the Newman Computer Exchange in Ann Arbor, Mich., are those still under DEC parts warranty and eligible for DEC maintenance.

Newman, who said most of his customers come from Fortune 1000 companies, also refuses to sell to the unsophisticated user. Newman emphasized that his firm refuses to do any form of user hand-holding. However, the firm does offer a 10-day unconditional refund on its products.

In addition to DEC hardware, Newman also deals in Data General Corp. hardware. Nova and Eclipse processors are the most popular, Newman noted.

All of the used computer vendors said they acquire hardware from a variety of sources. Newman prefers to buy out large installations where a company has gone out of business, decided to close a branch office or has migrated to a larger processor. Both Hartmann and Monosson use the same techniques, and all three dealers said they also buy single-processor installations.

Monthly Newsletter Examines Maintenance Policies on Used Gear

NEW YORK — What are vendors' maintenance policies on used hardware? The "Computer Economics Report," a monthly newsletter, recently completed a survey of major computer vendors, asking their policies on used computers.

Asked for their general policies on maintaining used equipment, vendors submitted the following answers:

- Hewlett-Packard Co.: HP will restore any product it has ever sold and will supply maintenance. Cost varies with the age of the hardware.
- Wang Laboratories, Inc.: No clear policy; however, the firm does not allow a second owner of a system to take over a previous maintenance agreement. Wang requires an owner of a used processor to take out a new maintenance contract. The stipulation, however, is that the equipment in question must be a product still maintained by Wang. The unit must be physically checked out by Wang and must have already been moved from its previous location. A credit check of the new owner is also required.
- Data General Corp.: Inspects the system, brings it up to the latest revision level and offers a regular maintenance contract.
- Control Data Corp.: Will provide maintenance on all its hardware, but pricing depends on the "nature of" the equipment.
- NCR Corp.: Offers the same support as provided to first-time users providing the system has been maintained to NCR standards by the first user.
- Burroughs Corp.: Second-owner maintenance is subject to negotiation.
- IBM: As a result of the 1956 Consent Decree, IBM is required to treat all its users alike regardless of whether they are original owners. Therefore, maintenance is the same as provided to the first user.
- Digital Equipment Corp.: Provides maintenance on a contractual or per-call basis.
- Sperry Univac: Examines the machine to determine what is necessary to bring it up to full operating level. The second user is then offered an annual maintenance contract.
- Honeywell, Inc.: "Consumer Economics" reported it could not get a response from Honeywell.

The newsletter warns users new to the used computer market to make sure they understand how maintenance is to be handled and to beware of deals where the availability of maintenance is questionable.

Since opportunities in the used computer market come and go quickly, users are often pressed into making fast decisions. Exact policy statements on used equipment are often difficult to come by. Many vendors, the newsletter reports, lack a definite policy on used-hardware maintenance, and users are often at the mercy of sales representatives who often do not provide the needed support.

For users faced with making an immediate decision on a used computer system, getting an answer from the OEM regarding maintenance often delays the negotiations.

While most major vendors usually provide some form of maintenance, they will often delay a precise cost estimate or require a prior inspection of the equipment, according to the newsletter.

Parts Availability

Another element to consider is parts availability. While IBM provides parts and support for virtually all its older products, other vendors do not. Often, spare parts and representatives trained in servicing older equipment are hard to find.

The newsletter noted that both HP and CDC, for example, say there may be extra charges for maintaining older hardware. IBM maintains hardware on a time-and-materials basis, but reserves the right to make the final determination as to whether a machine is maintainable.

"Consumer Economics", costs $295 per year and is published by Computer Economics, Inc., 150 Fifth Ave., New York, N.Y. 10011.

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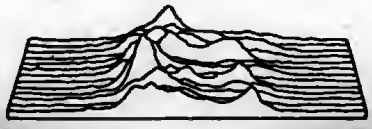

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Used Computers to Debut In 'War Games' Sci-Fi Film

CW Photo by J. Sullivan

David Sosna (left), associate producer of the movie *War Games*, bought this piece of equipment from used computer dealer Adolf F. (Sonny) Monosson (right) for the film. The hardware was loaded onto a moving van and driven to Hollywood immediately after purchase.

BOSTON — Some used computers will make their movie debut next year in a United Artists feature film entitled *War Games*.

Associate producer David Sosna explained that the film set needed some computer hardware in order to look authentic. Buying 43 items including processors, controllers, disk drives and memories was less expensive than building artificial computers, according to Sosna.

"We have a very large set that will look like a computer facility," he said. "We're going to populate the set more cheaply and realistically than if we built it."

"We're giving him disk drives that actually spin," said Adolf "Sonny" Monosson of the American Computer Group, Inc., a used computer dealer who sold the equipment to United Artists. "I didn't sell it to him for retail because the equipment doesn't have to really work," he explained. All that is required is that the motors run, Monosson said.

"They want a colorful set with a lot of blinking lights." The equipment was loaded onto the back of a truck bound for a nonstop trek to MGM studios in Hollywood, Calif., Sosna said.

Calling *War Games* an adventure film, Sosna said he could not reveal any more about the plot and added that the stars have not been cast yet. It will be directed by Martin Brest.

CPU Tracking Parental Assets in Bid To Recoup Child-Support Payments

BALTIMORE — Maryland's Department of Human Resources (DHR) is running financial-asset and tax-return information through its mainframe to determine the financial assets of parents who are behind in paying child support. The information is being used to help the state recoup funds spent on child-support programs.

"Nothing like this has been done before in child support," Ethel Thomas of the Office of Support Enforcement said. "What we're doing is using a computer match to determine assets. We recovered $1.4 million last year."

Tax Returns Assessed

If the computer shows that a parent who is more than 60 days in arrears for child-support payments is entitled to a state income tax refund, DHR can deduct the amount due from the refund before it is sent out.

The state has to match the federal grants that fund child support when parents do not make their payments. A single parent applying for the federal Aid to Families with Dependent Children program signs an application saying any payments collected from the absent parent will go to the state.

Maryland's Priority Delinquency Project, a pilot program funded by a $24,931 federal grant, was developed to aid the DHR in recovering child-support payments. The DHR is using its IBM 370/158 to compose a master list of parents whose payments are in arrears. Data on whether the parent is employed, whether the parent has made any past payments and how often, help the DHR decide which cases to pursue for payment.

State income tax return information is also being used to determine whether the parent of a child receiving state aid can make payments that are in arrears. Under a state law enacted in 1980, child-support payments that are 60 days or more in arrears can be deducted from a parent's tax refund.

The greatest aid the list provides the DHR is the knowlege of which cases are most likely to result in success if pursued. "There are so many cases, you try to prioritize them," Jo Atwater, public information officer for the DHR, said.

Spotlight Truly on Users at SAS Users Meet

By Lois Paul
CW Staff

SAN FRANCISCO — SAS Institute, Inc. seems to have found the formula for a truly user-controlled user group conference.

At last week's SAS Users Group International (Sugi) meeting here, there were no keynote speakers or "big names." Instead, the experts were the approximately 1,400 users, nearly 200 of whom presented papers on their approaches to using SAS Institute's Statistical Analysis System (SAS).

The role of SAS Institute's staff was to plan and develop the conference program, manage the large crowds that overflowed in each session and then stand back and let the users take it from there.

The staff was available to answer questions, to lead "Birds of a Feather" special interest group meetings and to field questions at consulting and training sessions.

The staff also presented invited papers, one of which was SAS Institute's President Jim Goodnight's slide show and description of the firm's newest offering, SAS/Full Screen Product.

Users in Limelight

Other than that, it was the users in the limelight. They were a diverse group, representing a mix of business, scientific and research backgrounds, but all sharing the use of SAS products on IBM and plug-compatible mainframes.

Sally Carson of the Rand Corp., one of the conference leaders, speculated that it was possibly the lack of standard user-group features such as keynote speakers that sets the Sugi conference apart from others. Carson noted that a number of her staff members opt for attending Sugi over other conferences.

Other attendees, including the conference chairman, Helene Cavior of the U.S. Department of Justice's Bureau of Prisons, remarked that Sugi attendees seem to share more common ground than those at other conferences. As a result, it is easier to find someone with whom to discuss similar problems and needs.

Conference Sessions

Conference sessions were divided into topics such as statistics, information systems and graphics. Sessions included users' detailed descriptions of customized SAS-based applications they had developed, and interfaces to data base management systems, such as IBM's IMS, Intel Corp.'s System 2000, Mathematica, Inc.'s Ramis and Computer Corp. of America's Model 204. In some cases users indicated that these interfaces are or will be made available to SAS users through SAS Institute.

CW at Sugi

Users freely described SAS's strong points — its ease of use, for example — as well as its not-so-strong areas, such as the handling of arrays.

In addition to the Sasware Ballot, which is their collective annual "wish list," users often included their ideas and pet peeves in the conclusion of their papers or as part of a final slide in their presentations.

Perhaps an indication of SAS Institute's receptiveness to these user requests was the presentation of a User Feedback Award, which was given to Harold Gugel of General Motors Corp. at the opening session of the conference.

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BLS Manager Sells Staff on Software Change

By Lois Paul
CW Staff

SAN FRANCISCO — How does e manager convince his staff to replace their traditional programming languages with statistical analysis software?

John Harvey Trimble Jr. of the U.S. Bureau of Labor Statistics (BLS) told attendées at the SAS Users Group International (Sugi) conference here last week how he did it.

To process quarterly Consumer Expenditure Survey data, the BLS is currently developing two large Statistical Computer Systems using SAS Institute, Inc.'s Statistical Analysis System (SAS) as the primary development language.

CW at Sugi

The systems will store, process end tabulate 650,000 expenditures from 4,000 families per quarter using a relational data base manager developed by Statistics Canada for the surveys, coupled with SAS through a user procedure.

Getting the users to switch to SAS was the hard part, according to Trimble, because "changing directions like this is hard to do."

His advice to managers faced with this type of project and a proposed "new" way of handling it was to carefully select the initial area to be tested, choosing one that is likely to be successful, Trimble suggested.

The key, he said, is to be eble to show results quickly. This will encourage other staff members to share the responsibility for choosing the particular course of action. "Success has many fathers. Failure is an orphan," he reminded his audience.

Managers should plan the development carefully, he said, establishing the management climate for the life of the project. Enumerate tasks, collect the resources required and schedule the project, he advised. The plan should be continually revised and the process repeated as requirements change.

Trimble decided to introduce SAS to his organization by teaching his staff structured analysis and design techniques based on the methods taught by Edward Yourdon of Yourdon, Inc.

This data flow methodology worked very well with the use of SAS as e language, he said. "One of the important things about using SAS is that there is e different concept involved. We find training people in structured analysis and design helps reorient their thinking."

After developing standards for the introduction of SAS in the design process, Trimble obtained expert advice. His group determined what they did not know ebout using SAS, then hired e consultant to fill in the gaps.

It then was necessary for management to encourage and direct the use of the new tools and methods. The consultant helped in this phase by critiquing the design. Trimble's group then documented its experience using SAS.

The analysis phase was the most important part of the project, according to Trimble. He determined the use of SAS based on how it best fit the project's needs. For example, in dealing with arrays it was better to handle this outside the SAS epplication because SAS does not handle these well.

Trimble offered both beginning and advanced training in the use of SAS and said this made a tremendous difference during the project.

Once a project is completed, the next atep is to publicize its success, he said, so "people working on the project can get a real sense of achievement."

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C-DATAPAK

Publisher Gets Sales Figures From Software on T/S Net

By Lois Peul
CW Staff

SAN FRANCISCO — An East Coast publisher of paperback books had a lot of figures to play with, but no system for determining how well his three product lines were selling. The answer: an interactive profitability analysis system using SAS Institute, Inc.'s Statistical Analysis System (SAS) and Boeing Computer Services, Inc.'a (BCS) time-sharing network.

Robert A. Jones of BCS in Seattle explained to attendees at the SAS Users Group International (Sugi) conference here last week that his client has three divisions, each with about 25 to 30 titles published monthly.

The system requirements, as explained by the publisher, include e collection of data on all titles since 1977; eutometed updating; 16 financial reports; and statistical graphics functions, including exploratory data analysis and forecasting models.

The publisher elso wanted an interactive system that would be expandable so new functions could be added as requirements changed.

The users of the system were to be marketing research personnel who had minimal DP training but a willingness to learn. Jones therefore chose SAS as the foundation for the system, he said, and developed an SAS macro library that would encompass the data management, reports and forecasting functions. The macros were an extension to the SAS language.

The software is being run on BCS' CMS/VM system, according to Jones, who wrote Execs that prompt the users for file name and desired format to enable them to update current information and add new titles to the data base.

There are 16 report functions, which include banner reports (eight), profit and loss statements (four), line sales reports (two) and profit and loss summaries (two).

Jones developed macro options to attempt to minimize the cost of using the system on a time-sharing basis. Benchmark tests indicated the options reduced the cost by ebout 66% in interactive mode and 30% in batch.

He also developed forecasting macros, which provide information on e fiscal, year and final sell-through basis. Information that begins with the month the title was published constitutes e fiscal time period; e year time period is exactly 12 months.

Final sell-through is e 48-month period.

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TSO Interface Now Available For SAS System

By Lois Paul
CW Staff

SAN FRANCISCO — A general-purpose Time-Sharing Option (TSO) interface to SAS Institute, Inc.'s Statistical Analysis System (SAS), which uses IBM's System Productivity Facility (SPF), was introduced here by IBM advisory programmer John L. Dickinson.

The occasion was the SAS Users Group International (Sugi) conference last week, where Dickinson addressed a standing-room-only crowd.

CW At Sugi

Designed to provide access to SAS under TSO, the interface includes access to SAS, OS data sets and SAS data bases using either commands or menus. Its other features, as described by Dickinson, are fast response during SAS program development; TSO development and execution of SAS programs while maintaining compatibility with batch processing; the ability to save, modify and reuse SAS programs under TSO and batch processing; and the capability to browse, print and save SAS programs under TSO and batch.

Dickinson claimed that use of the interface can more than double SAS user productivity. He pointed to requests from SAS users for a TSO guide, noting that the need is for more facilities rather than for a guide. The interface grew out of his own work with SAS using TSO since 1980, "I wanted quick results to try things out. I did not want to use batch."

Growing Usage

A few months after Dickinson developed the software the rest of his department at IBM began using it. Since then it has been installed at six sites for use by about 100 people.

The interface is used to edit SAS programs and browse results, Dickinson explained, primarily for program development. The panel interface consists of three additional SPF screens.

Dickinson said both new and experienced SAS users quickly became dependent on the interface, which reportedly can be learned within several hours.

He explained that it requires TSO an SPF, a full-screen display terminal, a PRINTOFF command and a CONCAT command for concatenation options. To date, the interface has only been used under the MVS operating system, he said.

The code and documentation is available from SAS Institute, most likely for the cost of distribution, Dickinson said. He stressed that it is on an "as is" basis and does not carry any warranties or support options from IBM.

Interested SAS users can obtain further information by contacting the SAS Institute, Inc., Box 8000, Cary, N.C. 27511.

SAS Gains Command Support for TSO

SAN FRANCISCO — SAS Institute, Inc. last week unveiled a new release of its Statistical Analysis System (SAS), which features command support for IBM's TSO from within an SAS session.

The company debuted the release before about 1,400 of its users at its seventh annual SAS Users Group International (Sugi) meeting here.

The 79.6 maintenance releases of SAS, SAS/Graph, SAS/ETS (Econometrics and Time Series) and SAS/FSP (Full-Screen Product) are available for users of IBM and plug-compatible equipment running under OS, according to the vendor. Conversational Monitor System support for all but SAS/IMS is scheduled for April, the vendor said.

'Last Release'

Described as the "last release in the 79 series," SAS79.6 is being shipped immediately, the vendor explained. Among its statistical features are multiple comparison methods and a new series of random-number generators.

Its nonstatistical features include a tabulate procedure, which provides hierarchical description tables and updates to the editor and calendar.

In addition, SAS79.6 is said to support SAS data sets on IBM 3375 and 3380 disks. The TSO function and statement in the release reportedly allows users to execute commands immediately.

TSO Command Feature

The TSO command feature includes a TSO command processor designed to invoke an SAS format library, according to the vendor.

Release 79.6 also includes new features for SAS/Graph, SAS/IMS-DL/I, SAS/FSP and SAS/ETS, the vendor said.

Current users can receive the new releases at no charge by contacting the SAS Institute, Inc. Distribution Center, P.O. Box 8000, Cary, N.C. 27511.

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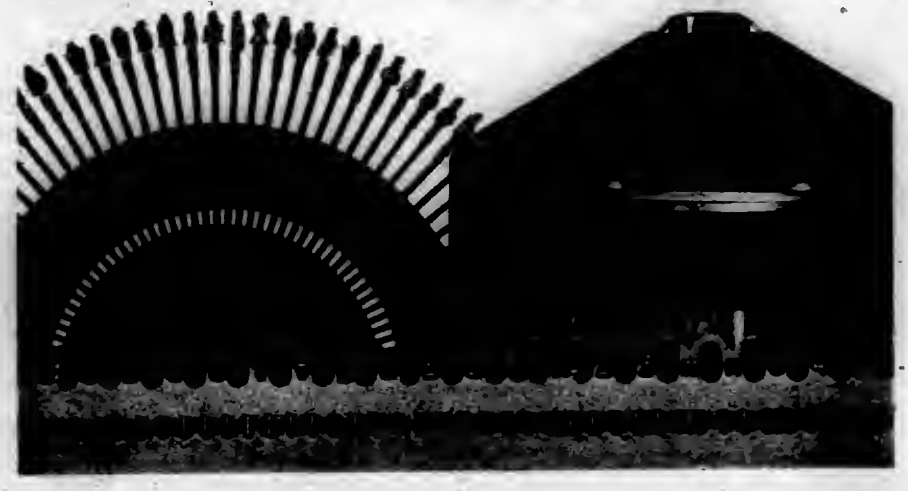

Bank Builds DP Forecast With Statistical Analysis

By Lois Paul
CW Staff

SAN FRANCISCO — The Bank of America's World Banking Division here is using statistical analysis software to help provida an updatable, five-year forecast of computing needs for each of its sites.

The bank is said to own one of the most extensive collections of IBM hardware enywhere in the world. However, its recent growth in computer epplications could quickly reach the maximum operational capacity of these systems, Systems Consultant Robert L. Cofer of the Bank of

CW At Sugi

America toid ettendees at the SAS Users Group International (Sugi) conference here last week. The Bank of America is e user of SAS Institute, Inc.'s Statistical Analysis System (SAS).

The ongoing project to forecast computing needs involves use of a matrix sampling scheme of 10 sites (by four different computer systems) to infer the planning needs of tha bank's computer sites worldwide. The bank hopes to develop a capacity strategy that would satisfy usage requirements for 10 upcoming six-month periods, Cofer explained, noting that tha project also maasures the accuracy of the forecasts and recommends any adjustments.

Four Components

The four components of the capacity planning process are establishmant of e planning base, forecasting of future requirements, developmant of alternetives and selection of strategies. According to Cofer, tha project's and products should include a clearly drawn epproach to performance measurement that could serve as a standard for all sites, identification of potential improvament opportunities for currently installed systems, definition of e planning methodology to guida the implementation of recent upgrade actions and a road map to lead to sharpened operational support and performance afficiency.

The six locations participating in the project are in San Francisco, Miami, Hong Kong, Singapore, Manila and San Juan. Cofer said the central site is dependent on the sites' own data collection technique; however, users are being trained in this area and some of the weaker data is being replaced.

Some of the data obtained includes utilization by hour, per type of equipment and particular application. From this data, Cofar's group can produce utilization graphics, which can reveal forecasted growth and projected needs.

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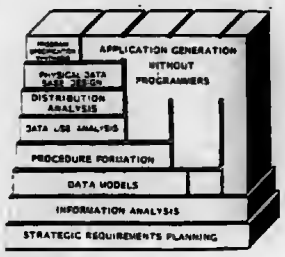

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SAS-Based Sentence Review Saves California $30 Million

By Lois Peul
CW Staff

SAN FRANCISCO — Some California state prisoners' sentences have been cut, saving the state approximately $30 million with tha aid of SAS Institute, Inc.'s Statistical Analysis System (SAS).

Wayna Finley and Bill Pannell of tha State of California's Board of Prison Terms described the SAS-based sentence-review program that they developed to ettendees et the SAS Users Group International conference here last week.

In 1977, the state introduced e determinate sentence law under which tha Board of Prison Terms reviews sentences given offandars to datermina whether they are fair in relation to other offandars charged with similar crimes. "Nobody knew how to do that, but they put it in the law," senior programmer/analyst Finley said.

Computerized Sentence Review

Finley and Pannell developed a computarized system of sentence review that would be more objective than e manual system and could provida data to legislators, who later would review proposed changes in tha law to determine if they were warranted.

The two developed the system using the combination of a local Four Phase Computer Systems, Inc.computer and remote processing via the State of California's Stephen P. Teala data center.

The SAS code is written and stored in tha local system. Tha Teale data center is used for running SAS jobs, for on-lina query to California's Department of Corrections' data base (under CICS) and for data base storaga, Finley explained.

Finley and Pannall mada a conscious effort to maintain good communication between Finley's DP department and Pannall's operations research group. One way they did this was to includa both groups in the same office. They also encouraged the researchers to write code, and they shared DP resources.

Documents Used in Review

The documents involved in the sentence-review process include court documents, Department of Justice "rap" sheets and information from tha Corrections Department. Once the required data is sifted from these various sources and run through several checks, it is processed in batch moda at tha Teale data center. The data then is processed through tha eutometed sentence-review function.

One of tha problems that had to be solved, Pannall recalled, was the variable number of records per case, such as more than one charge or more than one victim. Because this did not fit well on an SAS fixed-langth file, they created a master file and separate-but-connected files for charging victim and conviction data.

A statistical approach was needed to determine that a sentence was not longer or shorter than one meted out for a similar offense. They therefore decided to simulate what e judge does when ha sentences people, and they called the system "computer judge." This uses probabilities based on tha sentencing practices of judges across tha state in about 30,000 cases, Pannall explained. It calculates the sentence for the individual and than repeats the calculation 10,000 times to obtain a distribution of possible sentences for a given offender.

The program then compares tha real sentence to this distribution of sentences. When there is too high a variance, tha case is thrown out of the system for further analysis.

Pannall said that occasionally a person will be returned to the court system for resentencing based on the results of their sentence-review system. Ha noted that judges generally react much better to being toid a sentence is too long rather than being told a sentence is too lenient for a particular crima.

Software Improvement Top Category

Bibliography Lists Computer-Oriented Books

COLORADO SPRINGS, Colo. — Software performance improvement was the category most enriched by new books in the 15th edition of the Annual Bibliography of Computer-Oriented Books.

Released this month by the University of Colorado in Boulder, the bibliography lists more than 1,000 books from 170 publishers. More than 300 of the books are new this year, according to J. Daniel Couger, professor of computer and management science at the University of Colorado and editor of the bibliography.

The bibliography separates titles into 63 categories and catalogs them according to type (reference, textbook, handbook) and style of presentation (programmed instruction, case study or narrative). All introductory-type books published prior to 1979 were deleted from the bibliography, Couger said.

Software performance improvement was not the only category to add new books this year. The data processing management section grew by 14 titles. Computer programming now includes 92 books; 83 of them are new this year and 21 of those cover advanced programming techniques.

Basic and Cobol categories added 15 and 11 titles, respectively, and Pascal added 10. Three books each on Ada and Forth were added to the bibliography this year, but demand for Fortran books was down. Only eight Fortran books were published in 1981 compared to 12 in 1978, Couger noted.

Forty-two titles are available in the data base category, nine of them added this year. The distributed systems section now contains 16 books. The structured design category offers 17 selections and the MIS section added six new titles. Nineteen new books on computer applications were added this year and another 19 books on office automation are included in the computer applications section.

Still Growing

The microcomputer and personal computing section grew for the third year in a row and now contains 45 titles. The computer and society section offers 16 selections, and there are five new books on the subject of computer uses in law.

The lack of new books in several categories may be indicative of the lack of progress of computing in those areas, according to Couger. The section on computers in education, for example, had no additions. No new books were published on computer uses in marketing or in economics or in planning/forecasting. Only one new book was published on cybernetics.

Copies of the bibliography are available for $4 each ($6 if an invoice is required) from "Computing Newsletter," Box 7345, Colorado Springs, Colo. 80933.

Call For Papers

THIRTEENTH INTERNATIONAL CONFERENCE OF THE COMPUTER MEASUREMENT GROUP, San Diego, Dec. 14-17.

The program committee is looking for contributions to this event on subjects including capacity planning and prediction, work load characterization and forecasting, distributed processing analysis, I/O subsystem performance evaluation tools, user requirements and user service agreements, office automation analysis, installation management performance issues, productivity, DP budgeting, network optimization, change control and software-development performance prediction.

Four copies of abstracts are due by April 1, and completed papers must be in by June 1 to Program Committee, CMG XIII, Computer Measurement Group, Inc., P.O. Box 26063, Phoenix, Ariz 85068.

Notification of acceptance will occur by August 2.

INFORMATICA 82: THE BRAZILIAN NATIONAL INFORMATICS CONGRESS, Rio de Janeiro, Brazil, Oct. 18-24.

The Computer Users Society of Brazil, Sucesu, needs papers for presentation at its fifteenth annual meeting. Authors are invited to write on advanced DP technologies and applications, data communications systems and networks, data base techniques and applications, personal computation and micros, telematic services and applications, office automation, local-area networks, economical and socio-political aspects of informatics and education in DP.

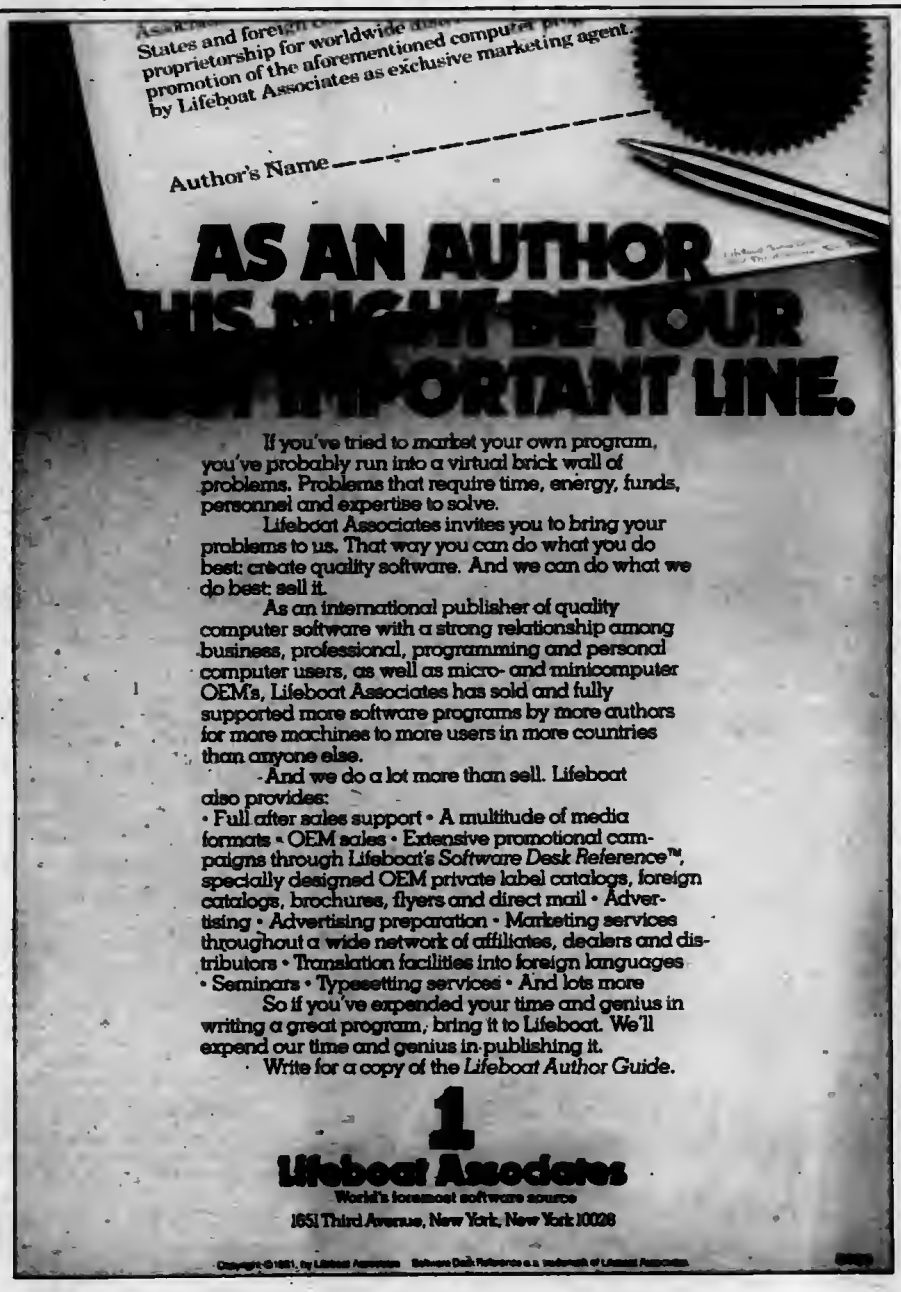
Abstracts are due April 30, should be typed, and not exceed two pages in length. Manuscripts are due by July 15. All correspondence should be addressed to R. Colcher, Sucesu, Rau do Carmo, 57 -6 Andar, 20011, Rio de Janeiro, Brazil.

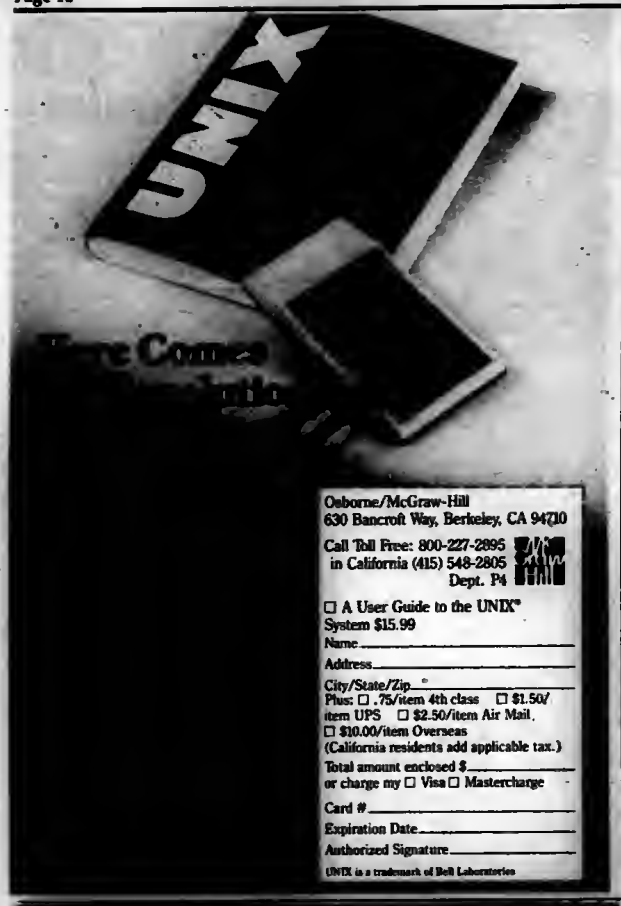
SIXTEENTH HAWAII INTERNATIONAL CONFERENCE ON SYSTEM SCIENCES, Honolulu, Hawaii, Jan 5-7, 1983.

This is the sixteenth in a series of conferences devoted to advances in information and system sciences. It is being jointly sponsored by the University of Hawaii and the University of Southwestern Louisiana in cooperation with the ACM and IEEE Computer Society Technical Committee on Computational Medicine.

Special emphasis will be given to medical information processing, comuter-based decision support systems for upper-level managers in organizations and office systems and technologies.

Authors are asked to submit 200 word abstracts by May 3 to Ralph Sprague Jr., College of Business Administration, University of Hawaii, 2404 Maile Way, Honolulu, Hawaii 96822. Completed papers are due by July 9, and notification of acceptance will be sent out Sept. 10.





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Computer Program Works As 'Intelligent Colleague,' Helps Track Logic Errors

By Lois Paul
CW Staff

ARGONNE, Ill. — Help may be at hand for the programmer who cannot determine why his program is not working properly.

Mathematical researchers at Argonne National Laboratory here have developed a computer program that was designed to function as an "intelligent colleague" to help find errors in the logic of other computer programs. The public domain software program is called the "automated reasoning assistant" (Aura).

Mathematician Larry Wos described the working of the program as being similar to the interaction between two programmers when, after a successful test run, a program is run against a large file and it blows up. Asked what could be the problem, the second programmer will take a look at the program, most likely focusing on one part of the code. He will write down some data entries that the program is not handling right. This is precisely what Aura is designed to accomplish.

"One of the hardest parts of programming is finding a small enough example of where a program fails so you can follow the structure," Wos said. Aura is intended to provide a series of examples of conditions under which the program is not working properly. This is different from a compiler, which provides lists of syntax errors.

The initial program (the one that is not working) must be run through a program transformation system, such as Tampr, which is used by the Argonne Laboratory staff. This breaks the program down into the conditions under which the program worked. Wos explained that this data is then fed into an Aura program to obtain examples of conditions under which the program would not run.

"If you give a programmer a number of examples, you give him an incredible 'leg up'," Wos said. Although the Aura program does not explain why the program failed, it gives the programmer information he can use to analyze the failure and determine its cause. It therefore can be used as an aid in finding potential bugs in programs. Aura currently is being run on IBM mainframes. The problem, according to Wos, is that it is written in Assembly with a front end in PL/1 and is not portable. It also is difficult to use at this point and really requires the assistance of experts. However, the Argonne researchers are developing a second program called Layered Machine Architecture (LMA). This is a portable program written in Pascal, which Wos said has many of the features of Aura. He described it as a set of tools for writing theorem provers and said most of these are interactive.

LMA currently is being implemented on Digital Equipment Corp.'s VAX superminicomputer and is being prepared for Alpha site testing. It can be used on any machine with a Pascal compiler, Wos said, noting that the software may be ready for testing at some sites by spring 1982. It is modular in its structure and therefore can be customized by users, who can obtain a "stripped-down" version, if necessary.

Wos said the most likely applications for the LMA software will be in computer-aided circuit design, plant design, "mundane applications" such as running a greenhouse and in businesses, for example, to test premises on which major decisions have been made. In this latter application, the programmer would use LMA to reason from these premises and see what conclusions are drawn. If these conclusions are not good, it can be assumed that they are the result of a bad premise. LMA also could be used for designing chips or computer systems and as an educational tool to help programmers learn to reason clearly.

'Machine Intelligent'

It is not really an artificial intelligence program, Wos stressed, describing it as being more "machine intelligent" in its workings. Aura was developed through the use of a logic language and rigid inference rules. The researchers wrote programs to embody these rules and tested them with examples, such as puzzles.

"We would make runs which are disappointing and then look at what these are doing, to attempt to determine the abstract property of the run that is disappointing," Wos explained. Based on these findings, the researchers built a strategy to determine a route whereby they could avoid this disappointing result.

Both Aura and LMA (when it is completed) will be public domain software, available free of charge to very determined users who want to use it in their own installations. Wos said there is a reference manual available with Aura, but it is by no means a user manual. Further information about both Aura and LMA can be obtained by contacting either Larry Wos (Aura), Dr. E. Lusk or Dr. R.A. Overbeek (LMA) at the Argonne National Laboratory, Applied Mathematical Division, 9700 South Cass Ave., Argonne, Ill. 60439.

Issue '82 Slated For Oct. 10-14

NEW ORLEANS — Issue '82, the sixth annual conference sponsored by Issue, Inc., is slated to take place here Oct. 10-14.

Issue, Inc., the nonprofit sponsoring organization, is comprised of SPSS, Inc. software users and coordinators, and serves as a forum for members to communicate with SPSS and each other. Topics to be covered at this meeting will include data analysis, statistical methodology, data base management systems, training materials and documentation.

Additional information on this conference can be obtained from Caryn Goldsmith, Issue, Inc., P.O. Box 11385, Chicago, Ill. 60611.

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Managers on the Move

Gil Russell

GIL RUSSELL has been named director of managmenet information systems for Red Lobster restaurants, headquartered in Orlando, Fla. He will be responsible for all information processing activities including system design, programming, data center, technical support and point-of-sale data administration.

Russell joined Red Lobster in 1980 as manager of computer operations and was promoted in February 1981 to manager of data center operations. Earlier he had managed data center operations at Kentucky Fried Chicken and Square D Co.

Russell is a former mayor of Rolling Hills, Ky., and a graduate of the University of Nebraska.

EDWARD S. HASKELL has joined the First National Bank of Chicago as a vice-president and head of the systems planning section of the Systems and Management Information Services (MIS) Department.

Haskell was formerly manager of major systems control software, Standard Oil (Indiana). Prior to that, he worked for IBM, where he was in charge of developing an integrated approach to office automation. Haskell is a former president of Share, an IBM users group.

Also at First National Bank of Chicago, CLAUDE G. STONE came on board as vice-president and head of the telecommunications and technological research section of the Systems and MIS Department.

For the past 16 years, Stone worked for IBM, most recently serving as marketing manager of the Chicago financial branch office. Prior to that, he was a marketing representative with Ohio Bell and Bell Laboratories, and later became systems engineering manager for Illinois Bell.

Stone holds a B.S. degree and an M.S. degree from Central Missouri State Unviersity.

•••

JOSEPH BODE has been named director of decision support systems and management science in the newly formed management information systems organization at Firestone Tire & Rubber Co., based in Akron, Ohio.

Bode joined Firestone in December after serving two years with the management consulting firm of Booz, Allen & Hamilton, Inc., where he was in charge of decision support systems practice. Prior to that he was manager of quantitative management services for Arthur Young & Co.

Bode holds a B.S. degree in mathematics from Villanova University, and a master's and doctorate degree, also in math, from the University of South Carolina at Columbia.

THOMAS SEITZ, also at Firestone, was appointed manager of business systems development for sales and marketing.

Seitz came to Firestone in 1974 as a scheduler in the Akron distribution office. In 1980, he was named manager of distribution planning for the inventory management division.

Seitz holds a B.S. degree in business administration from Kansas State University at Manhattan.

•••

DENNIS S. PRAEDIN has been named manager of systems and programming for Gilbert/Commonwealth Companies' Reading, Pa. DP organization, where he will be in charge of all systems development and programming projects and staff.

Praedin joined Gilbert/Commonwealth in 1978 with more than 15 years experience in data processing.

Praedin holds an associate of arts degree from Pennsylvania State Uni-

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Managers on the Move

versity and a B.A. degree from Muhlenberg College. He is a member of the Data Processing Management Association.

•••

WARREN L. HARKNESS has joined The Kendall Co. in Boston as manager of business sytems in the management information systems (MIS) department. In his new position, Harkness will be responsible for coordinating all MIS services to Kendall user organizations and will help to coordinate systems development plans and activities throughout the company.

Prior to joining Kendall, he was manager in the Management Consulting Services Department, Xerox Corp. He has also worked for Sikorsky Aircraft and Great Northern Paper Co.

He earned a B.S.E.E. from the Carnegie Institute of Technology, an M.S. in computer science from New York University and an M.B.A. from the Univeristy of Connecticut.

•••

MICHAEL A. COFONE has been named staff vice-president, corporate information systems and services, for RCA. in this position, Cofone will provide functional direction and control of management information systems (MIS) resources through the corporation.

A veteran of more than 30 years with RCA, Cofone has held various information systems positions in the then RCA Electronics Components group. He transferred to the corporate staff as director of the business systems group. In 1979 he was named vice-president, MIS, for the National Broadcasting Co., a subsidiary of RCA.

Cofone studied engineering at Duke University, business administration at Rutgers and computer science at New York University.

•••

ROBERT AMSTER has joined Litton Office Products Centers, a division of Litton Industries, as director of management information systems in Great Neck, N.Y. He will be responsible for all system support of six regions in a distributed processing environment.

Amster has been in the retail industry with K-Mart Apparel, Caldor, Inc. and Waldenbooks, Inc., a division of Carter Hawley, Hale.

•••

RAYMOND A. PELLETIER has been promoted to vice-president of management information systems (MIS) at C.F. Hathaway, a division of Warnaco, Inc., Bridgeport, Conn.

Pelletier joined Hathaway early in 1980 as director of MIS, prior to which he was manager of MIS at Central Maine Power Co. He also served Honeywell, Inc. as a field engineer and systems representative.

•••

JEROME KAUFMAN has been appointed vice-president, management information systems, at Lightolier, inc., Jersey City, N.J.

Most recently, Kaufman was the director of information services for Bristol-Myers of Hillside, N.J.

•••

The Information Systems Department at Drew Chemical Corp., Boonton, N.J., has announced three appointments:

ROBERT LA FALCE has been named manager of computer operations and will be responsible for data entry, data control and all computer production. He is currently attending County College, Morris, N.J.

RICHARD BOOZ has been promoted to systems manager and will be in charge of new systems development and maintenance. He joined Drew in 1979 and was most recently lead systems analyst.

ANDREW HOLMES has been promoted to data base administrator and will oversee the design of the company's data base. Since joining Drew in 1959 he has held several supervisory positions. in 1981, Holmes was the recipient of the Tiger Award from the U.S. Filter Corp.

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SRI Systems Head: Software Technology To Emerge From Stone Age This Decade

By Jeffry Beeler
CW West Coast Bureau

ANAHEIM, Calif. — Software technology has yet to progress out of the "Stone Age," but its cave-dwelling days will likely end during this decade, according to the head of SRI International, Inc.'s Advanced Computer Systems Department.

After remaining virtually unchanged for years, software development and management techniques stand on the brink of "an era of dramatic maturation," Dr. Patricia Whiting-O'Keefe predicted recently at a Prime Computer, Inc.-sponsored trade show.

Signs of the coming maturation, which will take place during the 1980s, are already beginning to become apparent, Whiting-O'Keefe said during the final day of Prime's "Spectrum of Solutions" conference and exhibition.

Criteria Changing

One such sign is an emerging shift in the criteria for evaluating software quality and effectiveness. Until fairly recently, for example, one of the chief messures of programmer productivity was the daily output of lines of debugged code.

But today, the efficiency of code writing is probably considered a less reliable measure of programmer effectiveness than the "efficiency of the user interface," Whiting-O'Keefe said. "It's meaningless to measure programmer productivity in lines of code because that kind of yardstick says nothing about how effectively a program is implemented or how well it addresses user needs."

A shift in values has also reportedly taken place in the way software is designed and written. For years, one of the main strategies in program development was to optimize CPU efficiency, Whiting-O'Keefe said. In addition, software was geared to be used primarily by highly trained specialists rather than by nontechnical end users and was intended to have only a limited life span.

Today, by contrast, programs are typically designed for long-term use and are increasingly required only minimal intervention by technically sophisticated operators, Whiting-O'Keefe said. Latter-day software also reflects increasing concern for reliability, ease-of-customization, fault tolerance, modularity and freedom from heavy maintenance requirements.

During a keynote address concerning "Integrated Information Systems for Business," Whiting-O'Keefe predicted the eventual proliferation of personal workstations for senior executives. But before these workstations gain widespread acceptance among top management, they will probably have to prove their capabilities to lower-ranking corporate officials, especially the business analysts upon whom senior executives depend for professional advice, she said.

ACM Assembly Set for October

ST. LOUIS — The first Association for Computing Machinery (ACM) Conference on Security, Audit and Control in Office Systems is slated to be held here Oct. 7-8.

The conference is being jointly sponsored by ACM special interest groups on business data processing, office automation and security, audit and control and will cover issues pertinent to each group.

Additional information on the ACM conference is available from Paul Karger at Digital Equipment Corp., 77 Reed Road, Hudson, Mass. 01749.

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College Learns Lesson About Computer Crime

By Bob Johnson
CW New York Bureau

NEW YORK — Are the victims of computer crime and fraud learning their lessons and installing methods to prevent future losses? Well, if the New York Institute of Technology (NYIT) is any barometer, they are — and experience is proving the best teacher.

After two of its former DP directors stole nearly $200,000 in computer time last year, the local college has taken measures to prevent anything similar ever happening again.

According to Bruce Laskin, the school's director of Computer Resources and Development, the main reason the college was so vulnerable to the computer theft was because of a lack of proper outside auditing of its systems. NYIT has become more aware of the necessity for computer security and is taking action as a result of the crime, he said. The college is employing a computer audit firm which will do twice-annual audits of what is going on at NYIT's data center.

VAX Replaces Sigma-9

Along with the system audit, Laskin said that the school is replacing its Xerox Corp. Sigma-9 computer (which was used in the crime) with two new Digital Equipment Corp. VAX-11/780 CPUs. He noted that the decision to remove the Sigma-9 was not based solely on the security consideration, but said it was definitely a part of it.

In addition to new hardware and auditing, NYIT is beefing up its physical security with new access and surveillance equipment. However, Laskin pointed out that the physical control in computer security is only a barrier to crime and not the solution to it.

"In the loss that occurred here, where two former directors manipulated the system, it was not a mechanical or machine problem, but a human one," Laskin said. He explained that at the time of the fraud, the school's computer operations personnel were "in the dark" about parts of the computer system's operation.

This, he said, allowed the former DP directors to use the system for their own gain. "I was amazed to discover that the operators didn't know how to use the Xerox page printer," he said. The new operations staff at the school is well aware of the operations and Laskinhopes it will add to the overall protection of the college's data.

NYIT's security problems are somewhat unique. Laskin said that because students have access to the computer facilities, special measures have to be taken in order to secure them. He said that the new twin CFUs will enable the college to separate the student's machine from the administration's.

'Security Hackers'

"Students tend to be security hackers. Breaking the computer's security is the thing to do today. They want to get into the real world of computers because they are bored with the mundane programs they are studying in the classroom. Breaking the computer's security is an easy, safe way to do it," Laskin said.

He added that he feels the new system will eliminate the student abuse problem and commented, "The worst they'll be able to do now is screw up their friends, and they will probably not want to do that as much as breaking the system."

The theft of computer time at NYIT last year was committed for more than just kicks however. It netted the criminals over $40,000 in illegal profits. Although the Nassau County District Attorney brought felony charges against the defendants, they plea bargained, pleaded guilty and agreed to initially pay NYIT some $20,000 in restitution. They were sentenced to three-years probation and will eventually have to pay back the entire amount.

Asked his opinion on administering justice to computer criminals, Laskin said the legal system is not keeping up with the modern crimes.

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Users 'Very Satisfied' With Average Model DF2M

By Hillel Segal
Special to CW‡

The Billings BC-12 Model DF2M computer showed only average capabilities for its class in the Association of Computer Users' (ACU) benchmark testing, but our telephone survey showed that users were "very satisfied" with their systems nonetheless.

The DF2M is one of two complete computers manufactured by Billings Computer Division, independence, Mo. The firm, about four years old, began as an effort of Billings Energy Corp., itself involved in the development of hydrogen power.

Billings' other computer, the BC-12FD, is similar to the DF2M but uses minifloppy rather than 8-in. floppy drives. The computer is also sold without disk drives.

Billings supplies a complete system including hardware, peripherals and business applications software. The BC-12 is used for accounting, word processing, data base management and as an intelligent terminal.

Major New Products

Major new products from Billings are expected soon: a distributed network system sharing the resources of a hard-surface disk, and an electronic mail system. The products have been announced and are near the point of first customer release.

While a very young company, Billings has about 50 dealers and sells both in the U.S. and abroad. It manufactures its own disk subsystems and assembles the computers in its plant in Provo, Utah.

With the Billings BC-12 DF2M, we continue reporting on the latest set of benchmark tests sponsored by the ACU. The tests are performed by the University of Colorado's Business Research Division in Boulder under contract for ACU.

Discussed in this article are two of the application problem tests. The scientific/engineering problem (C-1) solves a system of 50 linear equations and 50 variables using the Gauss-Jordan method of elimination. The test uses no disk access during the run.

The accounts receivable problem (C-3) creates a file on the disk (usually a floppy) and puts 50 records on it, each with 10 fields. Then the file is updated 10 times along with appropriate calculations for the accounts. To complete the test, a report is displayed on the screen. Since the accounts receivable problem uses both disk and processor operations, it is a more balanced indication of overall performance.

Mixed Results

Results for the Billings system were good to fair. In the accounts receivable test, its time of 5:09.2 was midrange. In the scientific/engineering problem, the time of 21:48.6 shows little aptitude for such applications. But this is not a unique finding in our tests; many of the business computers do not seem to be great number crunchers, yet still perform acceptably in the area for which they were designed.

The system as tested included the processor, 56K bytes of user memory and two dual-sided, double-density 8-in. floppy disks for a combined total storage of 2M bytes. Also included were the CRT and keyboard, two RS-232 serial I/O ports and a 180 char./sec printer.

Software supplied with the system included the Billings Operating System and Billings Ebasic language. The total price of all components and software was $12,395, which seems high compared to some of the newer systems recently released by other companies. However, a less expensive Billings printer could have been selected, reducing cost about $800.

The system is packaged with CRT and keyboard in one unit and disk drives in a separate enclosure. Two pairs of disks can be attached to one BC-12 system, and these may be shared with other BC-12s lacking disk drives.

The CRT displays 24 rows of 80 characters with reverse video, reduced intensity and 32 graphics characters. The 12-in. display uses green phosphor. The nondetachable keyboard includes a standard typewriter layout, a 10-key numeric pad and 16 special function keys.

Billings offers three printer models for use with their systems. Their word processing printer, the P-55, is a thimble-type letter-quality printer (NEC Spinwriter) operating at 55 cycles/sec.

The P-110 printer is a low-cost dot matrix printer with 100 char./sec speed bidirectional print-head movement and several modes of operation yielding from 80- to 132 char./line. The printer can be used with a 7 by 7 matrix for standard printout or a 7 high by 11 wide matrix for enhanced quality.

The printer used in benchmark testing was Billings' P-510, a 180 char./sec printer with 9 by 7 dot matrix, allowing descenders and underlining of characters. The printer includes a control panel for selection of margin and line spacing, page size and other features. Billings emphasizes the reliability of the printhead (650 million characters) as a significant plus.

One area of the computer's design was criticized by our benchmark team: lack of a hard-disk option for users needing more storage capacity. Billings officials have said they do not intend to offer this for the BC-12 itself, but are developing a central storage unit that will attach to as many as 16 computers.

Modified Version of Oasis

The Billings Operating System is a modified version of the Oasis operating system, which offers a number of powerful features. These include password protection, user accounting, a Help feature and Exec files which contain sequences of commands to be automatically executed.

The system supports the use of two versions of Basic plus Cobol, Fortran and Macro assembler. Ebasic was used for the tests; it's a version of Microsoft, Inc. Basic-80 and was quite acceptable in quality. The other version of Basic, Bbasic, is an interpreter-compiler combination with a number of special features, including CASE and DO-WHILE functions that may be nested to any level. The language supports sequential, direct and indexed sequential disk files.

Billings supplies several business application programs, including the Bookkeeper series (accounts payable and receivable, payroll and general ledger), Inventory Management, Legal Accounting, a data base management system, a word processing package and mailing list and document communications support. Software prices ranged from $200 to $500.

Especially noteworthy is the Training and Support diskette. It provides on-screen instruction to new users and is written in a friendly and entertaining style.

Billings also sells an energy management system for its computers, which is individually tailored for the customer and is available from the factory only.

Users contacted for comments were overwhelmingly pleased with the service they had received from their dealers. "Best part of Billings is training and dealer personnel," one customer said. Of 16 users contacted, only one expressed displeasure with hardware service; others said their equipment was very reliable.

Documentation supplied with the system was panned by some users, but training was highly praised. The application software received generally favorable reviews, although some users noted that early releases contained errors (later corrected).

Hillel Segal is president of the Association of Computer Users, a nonprofit association with members in the U.S., Canada and several other foreign countries. A package of information about the Association of Computer Users is available from the group at P.O. Box 9003, Boulder, Colo. 80301.

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System: Billings BC-12
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	C-1 Scientific Engineering Time (min)	C-3 Accounts Receivable Time (min)
Pertec PCC 2000	28:48.4	6:04.3
North Star Horizon	12:01.9	1:57.7
Cromemco System Two	14:52.6	2:48.0
Texas Instruments 771	22:05.4	3:38.1
Vector Graphic System B	19:30.0	5:56.5
Decstation 78	7:55.7	4:21.5
Radio Shack TRS-80 Model II	20:00.7	3:38.6
Apple II+	21:11.0	6:17.4
Digital Microsystems DSC-2	13:24.9	3:28.8
Ohio Scientific C3-A	12:10.7	15:49.3
Alpha Micro AM-1011	5:18.3	3:25.3
Data General CS/10 Model C1	58:21.0	*
SD Systems SD-200	17:42.8	6:16.4
Wang 2200SVP	2:13.3	2:23.0
Altos ACS8000-15	7:54.5	10:41.5
Altos ACS8000-6 (hard disk)	7:54.5	1:35.1
NEC Astra 205	14:27.9	5:10.8
Dynabyte 5300	5:39.5	4:38.0
Billings BC-12 DF2M	21:48.6	5:09.2
Commodore CBM-8032	to be covered in future issues	
Smoke Signal Chieftain		
Vector Graphic 3005		
Xerox 820		
IBM Personal Computer		
IBM 5120		

* Tested with hard-surface disk rather than floppy. C-3 time was 2:40.3.

This is the 47th in a series of articles giving the highlights of benchmark tests conducted on popular small computer systems. The full reports are available from the Association of Computer Users.

Simulation Prescribed to Manage Economy

By Robert Batt
CW West Coast Bureau

LA JOLLA, Calif. — The Reagan administration should adopt widespread computer simulation techniques in an effort to improve its management of the economy, according to the Society for Computer Simulation (SCS) here.

Although high-level meetings with White House aides have taken place, little progress is being made in the effort to put policy decision making on a more systematic basis, an SCS spokesman said.

Despite such controversial admissions by David Stockman, the director of the Office of Management and Budget (OMB), that "none of us really understands what's going on with all these numbers," SCS officials said there is great resistance to the use of simulation techniques in government agencies.

"Progress to date has been very disappointing," SCS President Stewart Schlesinger said. "There has been no effort on the part of the current administration to foster some models for the national economy. No attempt is being made to use models to cover the gaps in government policy."

Simulation Areas

Schlesinger asserted that areas such as taxation levels, monetary policies and the effect of certain investments on the gross national product were all legitimate areas for simulation.

It was, he said, very important in the current climate of public expenditure cuts to have an idea of what impact a shift in the balance of resources would have on the economy. Simulation techniques could be used for this purpose.

Having a broad national model is one way the administration could deal effectively with Congress, Schlesinger argued, because it would enable opposing parties to have a nonpolitical discussion about political issues. At the moment, he said, models are being used to come up with answers that support the Government point of view, rather than posing genuine policy alternatives.

"The main value of simulation is that it forces people to think more rigorously. You find out that things happen in a surprising way and that often your gut reaction produces counterproductive results. Simulation does away with gut feel management," he said.

OMB a Natural

Schlesinger claimed the OMB was a natural place to use computer simulation since it was the job of that agency to assess statistics in an impartial fashion, separate from the various government departments that were pushing their own policies.

Remarks attributed to David Stockman that appeared in the *Atlantic Monthly* magazine indicated that the OMB director changed the agency's computer program when it failed to come up with figures that supported the government case.

"People in government have a tendency to look for the model which gives them the answer they want to hear, rather than models which offer new concepts and techniques," Schlesinger claimed.

"Building a computer simulation disciplines your thinking. But when you have these numbers and no means of rigorously interpreting them through a model, you cannot possibly make intelligent appraisals."

Politicians concerned with qualitative projects failed to understand the usefulness of guantitative analysis in decision making, Schlesinger explained.

In an effort to promote the use of computer simulation in government, the SCS has announced a program to select the 20 most effective decision makers around the world who will receive information from the SCS on the use of computer simulation as a decision-making tool, he said.

So far 33 people have been nominated for the program, most of them advisors to political figures including a representative from the OMB and director of planning and evaluation in the White House.

The closing date for nominations is March 1 and a panel of SCS members from the U.S., Germany, India and Canada will select the 20 people to receive SCS support.

DPers Wanted On Holocaust Project

BROOKLYN, N.Y. — Computer professionals interested in participating on the Advisory Committee for the Computerization of the Holocaust Archives of Yad Vashem in Jerusalem are being sought by Prof. Henry R. Huttenbach.

This committee will examine the problem of preserving 10 million papers and photographs documenting the imprisonment and extermination of Jews in German concentration camps during World War II, according to Huttenbach.

Yad Vashen is an Israeli institution that houses this documentation and its staff is now searching for a method of permanent storage, Huttenbach explained.

Those interested in participating can contact Henry R. Huttenbach, 321 Sackett St., Brooklyn, N.Y. 11231.

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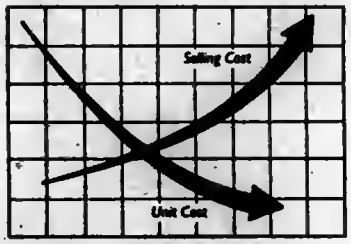

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Local Fees Pay Operating Cost

Environmental System Shaping Area's Future

PALM SPRINGS, Calif. — An environmental planning system is paying for itself through fees paid to local governments by contractors who need the computerized information.

The computer-based Master Environmental Assessment (MEA) system is operational for the Coachella Valley Association of Governments (Cvag), e coalition that includes the jurisdictions of Palm Springs, Rancho Mirage, Palm Desert, Indio, Indian Wells, Coachella, Desert Hot Springs and Riverside County.

The system was designed and implemented by Comarc Design Systems. The San Francisco firm specializes in the production and application of geographic-based computer information systems to assist in management and environmental planning.

The Cvag MEA Project included three phases: the "What Is" phase, the "What Could Be" phase and the ongoing MEA project, Comarc President Ronald L. Walters explained.

During the first phase, en extensive data base was creeted consisting of encyclopedia-like reports, a set of manual maps and a comprehensive set of geographically based computer files.

In the second phase, meetings were held separately with developers, elected officials, planners and others to solicit urbanization policies likely to be in effect during the next 20 years.

"For example, the participants would typically state that development would to e greater or lesser degree be discouraged from flood zones, steep slopes, prime agricultural soils and areas with no slack sewer and water capacity," according to Walters.

Such information was messaged so the computer could identify where such areas are located and could thereby generste alternative scenarios of urbanization in five-year increments for the entire valley.

"Different scenarios emerged for each group'e set of policies," Walters said. "Ultimately, all the scenarios were combined to show areas which would be most likely to develop, less likely to develop and not likely to develop."

A final report documented not only the process used and the maps generated by the computer, but also the environmental impacts associated with all the different scenarios.

State-of-the-Art System

In the ongoing project, the communities of the valley jointly agreed thet a state-of-the-art computer system should be set up to keep all the MEA data current and to provide ready access for e wide variety of uses, including environmental impact statements.

A corporation set up here — the Coachella Valley Land Information Center — now uses a 1M-byte Data General Corp. S-140 computer to provide data processing capabilities.

Nerrative, tables, formulas end maps relating to geology, minerals, soils, flora, fauna, climete, groundwater, surface water, air quality, government services and labor force are now available and cross-indexed to facilitate use of the system in e variety of epplications, according to Martin Prisco, Information Center'a president and general manager.

The computer files, in "polygon" rather than "grid" form, cover maps as diverse as sewer capacity, topography, census tracts and scenic resources.

The computer system is set up so that data relating to any part of the valley can be quickly retrieved and interrelated with data for any other part of the valley, Prisco explained.

Output includes maps plotted by the computer at any scale, acre summaries and automatically generated environmental impact statements for different types of development on different sites.

On-Line Terminals

While users of the system now get their data in the form of reports and maps, on-line terminals may access the information in the future. "Palm Springs is now considering graphics and text terminals in its planning department to access the data," Prisco noted.

Perhaps the most unique feature of the project is the fact that the operating costs of developing the system will be recaptured through fees paid to the local governments by the builders, developers and contractors who need the MEA data.

"Because of its overall efficiency, these fees will be much lower than prior report costs and lower, too, in comparison to other fees charged for similar services throughout the country," Walters observed.

Education Group Elects Three As Officers

BOULDER, Colo. — Cause, e professional organization aimed at the development, use and management of information systems in higher education, has elected three new members to its board of governing officers.

Elected to serve three-year terms were: A. Wayne Donald, assistant to the director of computing resources at Virginie Polytechnic Institute and State University; Dorothy J. Hopkin, director of administrative data procesing et Michigan State University; and Charles H. Naginey, director of management services at Pennsylvania State University.

The three members were elected by mail ballot by voting member representatives end will serve three-year terms, according to e apokeswoman.

At a board of directors meeting held lete last year, Ronald J. Langley, the organization'a 1981 secretary/treasurer, was elected Cause president; and Wade Harris was elected as the group'e vice-president.

Langley is presently director of data processing and information systems at California State University, Long Beach. Harris is the director of auxiliary enterprises et Eastern Washington University.

James L. Strom, director of development et Clemson University, was elected to replace Langley as the association's secretary/treasurer.

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S&L Firm Sells In-House System to Outsiders

CANTON, Ohio — Not every company decides to buy packaged software. A savings and loan firm here instead developed an in-house financial system that it eventually sold to other companies.

Faced with the decision to "make or buy," Citizens Savings Association decided to develop an in-house software and data base management system. "We made the necessary investment of time, manpower and resources to have the best on-line, modular-designed, integrated system possible," marketing representative J. Daniel Bernard explained.

In 1965 the company installed its first on-line computer system and by 1970 began selling the package to other institutions.

Bernard offered suggestions to help other firms make the right DP decision regarding making or buying software. "If you make it, plan ahead . . . If you consider to purchase software, there are several questions and research items involved in selecting the right software to do the job," he said.

Some questions to ask are:

- Will the software meet long-range objectives?
- Is it user-oriented with professional and competent representation? What type of support, user meetings and communications?
- Know or find out who developed the original software package and deal with them directly. What is their history of success and how long?
- Do we have the staff on board to implement the system for technical support and operational implementation?
- Can we get it when we need it? Does it fit in with the way we do things? What alternatives?
- What will it cost for direct, indirect and on-going maintenance?
- What manual procedures will it replace and who will it affect and how?
- What features for inquiry and report generation? What data base system?
- What language, program design, transaction logging and auditing, security provisions, ease of modification, recovery/back up procedures and documentation?
- What hardware limitations, training and training costs, conversion, installation and contracted rates for modification?
- Will the software interface to facilitate existing or future hardware and be compatible?

Other Considerations

Other considerations are to review current users for product quality, adaptability to change, history of financial earnings, on-site visitations and interviews; compare costs and long-term usage of system; evaluate, analyze and document all of the above; and select a system.

"When you consider to buy software of any kind, it is a decision you may have to live with for a long time," Bernard said, cautioning, "Don't be fooled by companies claiming that they are the originators of their software, when in fact they bought it, added to it in some cases and then market it as their own. Don't be fooled by a look-alike system. Go to the source and be sure."

Citizens Automated Systems' choice "to make" has served it well, according to Bernard.

Although other firms that make this choice will not necessarily become software houses as a result, as this company did, the decision to "make or buy" is still an important one.

Phillips Releases Satellite Directory

WASHINGTON D.C. — Phillips Publishing, Inc. has released the "1982 Satellite Directory." It is designed as a source for business people in the communications industry and as a reference book.

The directory contains up-to-date listings of hardware manufacturers, technical service companies, consulting firms, programming distributors and other companies that provide goods and services to the satellite industry.

The directory also lists licensed earth stations in the U.S. and contains information about the major international and domestic commercial satellite systems, their operational satellites and customers. The directory costs $95 ($85 for companies entered in it) and may be ordered from the Subscription Depatment, Phillios Publishing, Suite 1200N, 7315 Wisconsin Ave., Bethesda Md. 20814.

Complex Implementation

Solar Group Sees Light in Management Tool

GOLDEN, Colo. — Implementing management software within a fast-growing organization is a complex task, as the Solar Energy Research institute (Seri) here has found during its four years of operation.

Seri, the U.S. Department of Energy's lead center for research, analysis and dissemination of solar energy technologies, opened its doors in July 1977. Already it has grown to an organization of more than 600 employees, occupying some 270,000 square feet of office and laboratory space, with a proposed 1980 budget exceeding $100 million.

Seri works to reduce the technological, legal, economic and institutional barriers to widespread solar use. It manages the nationwide Solar Energy Information Data Bank, with the participation of four Regional Solar Energy Centers.

Financial Applications

The administration of a rapidly growing organization requires the use of financial applications, and these are a key part of the management information system developed and implemented by Seri's Computer Systems Branch, according to project directors George Gielow and George Fovoy. Data processing facilities for management information systems (MIS) functions are provided via remote batch by Martin Marietta Data Systems, Inc.

For the software itself, Seri turned to Management Science America, inc. (MSA). It was felt that the purchase of software packages would not only reduce the time and expense involved, but would gain the integration of various financial applications supported by the vendor, although some ability to tailor portions of the system would be sacrificed, Geilow said.

He and Forby felt these system tailorings would be regained through the flexibility of the packaged software to cope with organizational and accounting changes, which occur frequently in any new organization.

Short Time Frame

Because of the short time frame for implementation of MIS at Seri, a mixture of internal Seri resources and new hires, in addition to vendor support, was required to bring the system to operation, Gielow explained.

The first move after selection of the software was to find experienced personnel to assist in the implementation. This was done by attracting a major project leader from outside Seri. This person had extensive experience with MSA software, which correspondingly shortened the training time required and provided capability for a great deal of internal support.

Seri personnel, the service bureau supplying computer time and MSA all provided technical resources to install and test the software. Additional vendor support was provided in the areas of on-site and off-site training and telephone support.

Implementation of a full-scale general ledger, encumbrance recording, and accounts payable system — and a payroll-personnel system with weekly labor distribution to general ledger and a semimonthly payroll — was accomplished with additional assistance from a contract programmer and Seri'a accounting branch, Forby explained.

The period required for implementation was only seven months, although additional steps are currently being taken to capture prior history.

Software Implementation

The implementation of management software at Seri required definition of management philosophy prior to proceeding with system implementation. The Seri project team found that it was assisted in all of these areas by effecting formula for dealing with problems.

The key tenets included familiarity with the system documentation and company policies. "When a problem arises, research the probable causes and explore solutions to the problem in the documentation before calling the vendor," Gielow said.

When the vendor must be called, inform the support person of what efforts have been made and steps taken to resolve the problem, he continued. When the call is made to the vendor, indicate that you have a problem with the given system and describe that problem.

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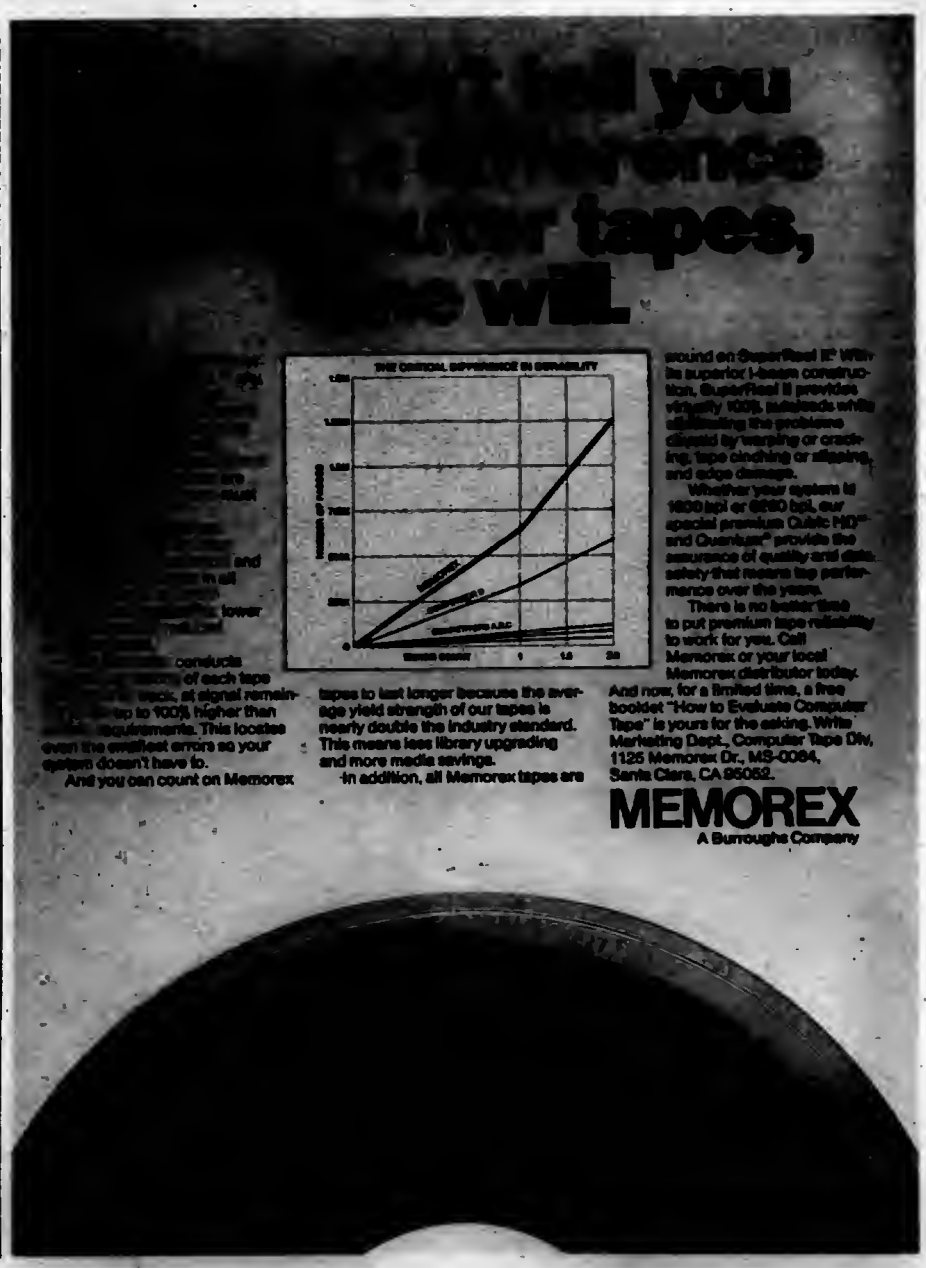


Before Buying Applications Package

Exec: Look Beyond Software Functionality

PASADENA, Calif. — Looking at an applications package is like looking at a house. While you make your initial selection by features like location and number of bedrooms, there are architectural basics — the foundation, the structural design and the quality of the materials and workmanship — that you have to inspect before you buy.

This is the way Stuart P. Orr, chairman of Stuart P. Orr & Associates, Inc. here, perceives the process.

The initial selection of a software package is made by its features and its functionality, he explained recently. "But you have to look beyond functionality and study its architecture, its foundation (the initial system design), its structural design (the overall architecture) and its quality of construction (the code and its documentation).

These make the difference between a product that is initially satisfying, but later deficient, and a product that can adapt to changes over time.

Orr said that three questions potential buyers should ask are: Does the package perform as advertised? Does it function as expected? Does it solve the business problem?

"After you get answers to these three, ask these next three to look at the architecture," he continued.

• Does the software architecture reflect a system designed with an adequate understanding of software engineering so that changes over time enhance the value of the system rather than degrade it?

• Does the software architecture reflect a system designed by people with an adequate understanding of business?

• Does the software architecture reflect a system designed with an adequate understanding of managing information as a corporate asset?

The ability of the software package, and the firm that produced it, to adapt to changing times is the single most important criterion for evaluating architecture, according to Orr. "At the features level, all business packages start to look alike after a while. Only at the architectural level does the adaptability of a package become apparent, because it is the architecture, not the features, which determines adaptability."

How do we judge adaptability? Here are a few specific questions you might ask, all beginning with "How easy is it?" he said.

He suggested that buyers should determine how difficult it would be to translate changes that the in-business requires into a design change in the package, to make programming modifications required by the design change, to change information management mechanisms in the system, to do a quality assurance check on the package once it is modified and to update documentation associated with the revised package.

"If your inspection of these fundamentals shows the package is easily adaptable, then the foundation is basically sound," he noted.

"An application package is valuable only to the extent that it accommodates 'how the business operates,'" Orr continued. "A software package must show that its designers understand the difference in the needs of the warehouse clerk, the controller and the vice-president of marketing," according to Orr.

For example, does the package's general ledger have the extensive audit trail necessary for the controller to withstand an IRS audit? Can the marketing vice-president use the package to generate a sales analyses report (perhaps from the same data) in a high-level fashion that makes significant sales trends apparent? Can a clerk use the package for data entry and information retrieval?

People, materials, money and equipment are the four traditional assets of a business, which must be properly planned, acquired, cared for and controlled, he said.

Data Questions

The question, then, is how does the software package acquire, care for and control data? Orr suggested the user can ask the following questions to determine this.

• Does the package capture data at the source and then integrate it so that it can be used by a variety of users for a variety of tasks?

• Does it acquire data one time so that reconciliation, an enormous time waster in business, is unnecessary?

• Does it check data properly at its capture so that data in the data base can be trusted?

• Does it care for data effectively? Businesses operate on the principle of transactions and a package's transaction handling capabilities are one of these architectural features that must be inspected.

• Does it capture, in addition to raw data, all the accompanying data needed for audit trails?

• Does it update company files appropriately, recheck for accuracy, distribute the updates to the proper departments and record what happened so that you could reconstruct the transactions if catastrophic problems occur?

• To what level does the package reflect a concern for the security and integrity of the data?

• How does it assure that transactions are posted to the correct time period?

• How does it make sure transactions are in balance, that is, that debits equal credits in the accounting system?

• What are the fiscal controls against errors and fraud?

• Will its audit trails sustain an independent audit?

• How does the package prevent unauthorized uses?

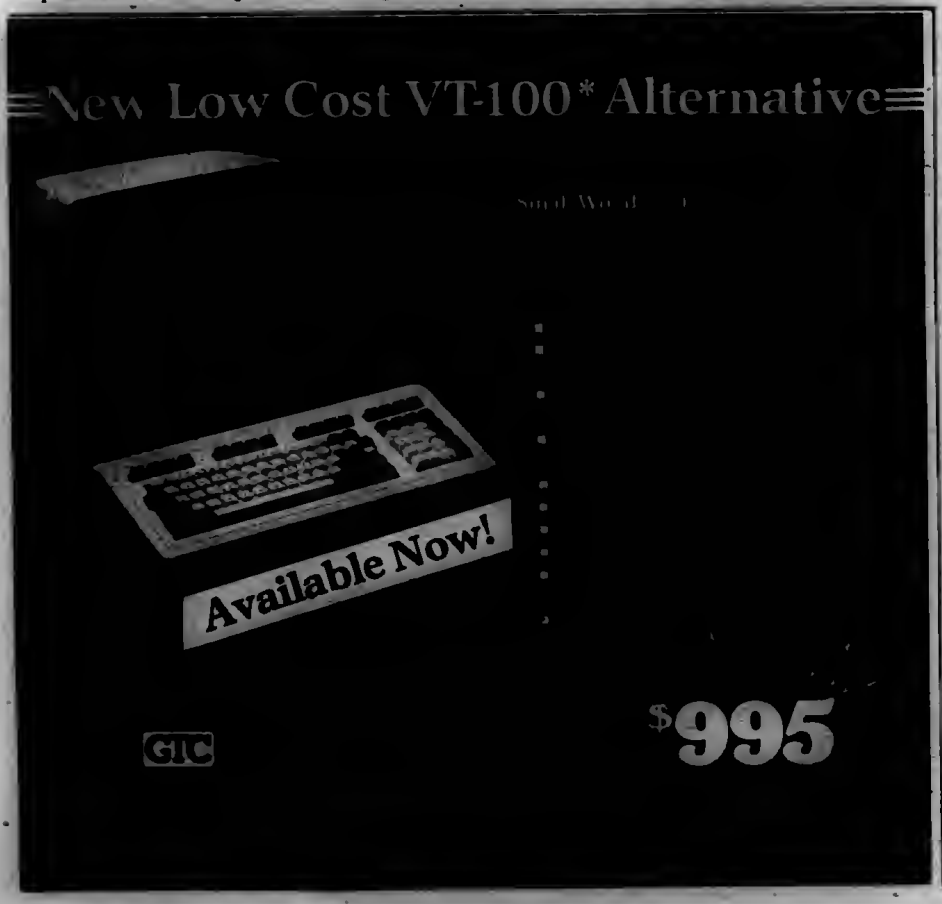
"The only way to determine for yourself whether a package will support you over the long haul is to inspect its architecture," according to Orr.

Absentee Ballot System Brings Mixed Returns in New Orleans

BATON ROUGE, La. — A new computerized system of counting absentee ballots was tried for the first time in a New Orleans election on Feb. 6, according to Louisiana Elections Commissioner Jerry Fowler. However, the project was not completely successful.

In an attempt to speed the counting of some 2,000 absentee ballots, the commission was testing the American Information Systems AIS 315 computer and software for possible future use, Fowler said. The counting of the ballots was achieved, but somewhat delayed by the inability of the oversized ballots to fit into the machine and be read by the optical mark reader.

Fowler still has faith in the use of computers at election time, calling this problem a minor snag. An April 4 election will test another computer system, and Fowler said he hopes to someday computerize all ballot counting for the state's elections.



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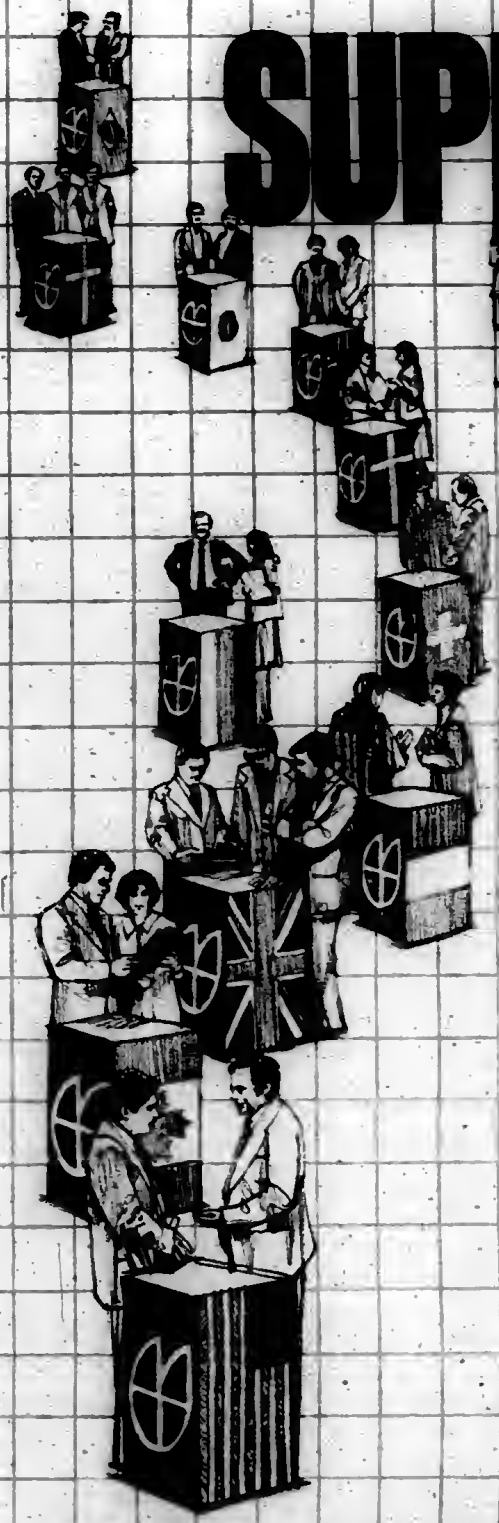

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In U.S., Emphasis on Economics

Swede: Europe's Tech Policy Politically Based

By Rex Malik
Special to CW‡

SANDERSTED, England — The introduction of information technology in Europe is proceeding along markedly different routes than in the U.S. and Japan, according to the chairman of Sweden'e Data Policy Commission.

Commission Chairman Olof Johansson, who is also Sweden's Minister for Civil Service Personnel, observed in e recent seminar here that a common thread existed in information technology as it was being evolved by European governments. That common thread was that information technology policy was essentially political, not economic. This is in marked contrast to policy evolving in the U.S. and Japan, where economic motives are the driving force.

Johansson made his remarks at a seminar on the Forward Assessment of Science and Technology (Fast), e major research program funded by the Commission of the European Economic Community (EEC).

Johansson's commission had just issued its long-awaited initial report on information technology policy. The commission agreed on three fundamental principles. First, there must be democratic participation in the creation of systems where those systems affect people. Systems creation should not be solely the responsibility of management.

Second, one must take a holistic view. The commission felt it was essential to consider the interactions; separate sectorial policies individually pursued by government departments were no longer feasible.

System Impact

A system put in by one ministry or department for one particular purpose is likely to impact on the policies and activities of another. Much of the government's effect in the area of information technology is now devoted to seeing that ministries march in step. This was particularly so in the three key ministries, Employment, Industry and Education.

Third, information technology in work should be secondary and supportive. Dirty and dangerous jobs epart, the aim should not be to replace people but to increase their capability.

What the commission was proposing was that social guidelines should be followed in determining whether or not to introduce information technology. The commission felt that policies based on such guidelines would in fact stimulate technological development as much as market forces had done.

Massive Investment Effort

The policies should not be construed as being against the introduction of information technology. The commission egreed that e massive investment effort is required in Sweden. The government has in fact found itself on e number of occasions the largest customer in Europe for some systems.

Much of the investment required, too, which would have to come from society, was not in technology directly.

Swedish investigation has shown, for instance, that much of the educational infrastructure required for the wider use of information technology does not yet exist. For instance, the provision of technology was not e great problem; however, the finding of qualified teachers was.

In a side comment on experience gained with Sweden's Data Protection Act, an ect which when passed in 1973 was the first such act, the minister stated that figures now available show that personal data about Swedish citizens was held, on the average, on 150 computer systems, both public and private.

Malik is e free-lence computer journalist based in London.

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French PTT Expands Efforts To Switch to Electronic Directories

By Rex Malik
Special to CW‡

SANDERSTED, England — The French postal, telephone and telecommunications (PTT) euthority has ordered e further half million terminals to add to the 300,000 currently being installed. Half of the first batch is being installed in Brittany, and the rest will go to Paris, which will also ebsorb all of the second order.

Much of this research is concentrated on the consequences and implications of the introduction of information technology in Europe, particularly its implications on work and employment. It involves researchers in all the European Economic Community (EEC) countries, whose studies are funded in part by the EEC and by their local governments.

Fast Seminar

So said Jacques Dondoux, director general of France's PTT, to the Forward Assessment in Science and Technology (Fast) seminar held here recently.

The EEC has so far spent more than a million dollars on 11 research projects involving 25 institutions and is well under way into its second million since Fast was set up early in 1979.

Dondoux outlined some of the elements of the new French government policy for the development of the Telematics program. The major changes are two. First, the installation policy is to rely on free choice. Users will have the option to either take the terminal and access the electronic directory or remain with the paper directory.

Electronic Directory Preferred

Surveys carried out indicate that, given the choice, one in two telephone subscribers would opt for the terminal.

Dondoux did indicate, however, that the government looked on the electronic directory favorably, pointing out that over the long term it would be less expensive for users. Currently, Paris-area subscribers receive directories weighing four kilograms each year. Two kilograms of that is accounted for by the street directories; these will be done eway with in any case so that anyone wanting the facility will be driven to the electronic system.

Second, the new policy is to introduce the electronic directory only in major towns and urban regions. Small communities and country areas will continue to be served by paper directories.

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Insurer's Realty Group Finds Lots With T/S

NEW YORK — Buying real estate is a complicated affair at any time. But when $16 billion is at stake, making a sound investment becomes even more critical.

Equitable Life Assurance Society of the United States recently sought the aid of a time-sharing company in order to provide its real estate managers with computerized analysis of real estate transactions.

The firm is using a decision support system (DSS) offered by Tymshare, Inc.'s Realty Operations Area (ROA). Chuck Dvorkin, director of the division's systems department, said that the service has improved managers' decision making and has reduced the turnaround time on ad hoc reports from one or two days to several hours. The service has also reduced reporting time on a closing by almost 75%.

The primary responsibility of the division is to manage real estate investments made by Equitable for its policy holders and clients. The funds for the investments come from individual and group insurance policies and from pension funds from large corporations and unions. The current real estate portfolio includes $5 billion in real estate investments and $11 billion in mortgage loans, Dvorkin said.

In the past, Equitable managed these funds with a batch system, but as the portfolio grew, problems developed.

"Our ability to maintain data was no longer timely. If one of our managers needed information not furnished in the standard system reporting, he would come to us with a request for a special report. Depending on the complexity of the report, it would take one or two days to provide results. By that time, the deadline for decision making had already passed.

"Our managers were in a position of making investment decisions involving millions of dollars on the basis of manual analysis," Dvorkin said.

For Easier Access

In addition, the DP manager said, the firm was unable to expand its data base to capture additional information for proper rate of return analysis. "We decided our problems could be solved by taking the data from our batch accounting system and making it available in an interactive, decision-support-type environment," Dvorkin recalled.

In mid-1980, the ROA division began using Tymshare's Tymcom 370 DSS. Dvorkin said that it offered data base management capabilities that were compatible with Equitable's IBM 3033 processors at the corporate data center.

"We wanted our managers to be able to access and manipulate information themselves, through ad hoc inquiry and reporting," Dvorkin said.

To access the DSS, ROA managers use the telephone and a portable terminal. The system includes two main files. The property file contains all income and expense data, as well as budget appraisal and mortgage information on 600 Equitable properties. Managers can access records for the past five years via the terminals, using the resulting information as a basis for future investment decisions, Dvorkin said.

The second file contains the name and addresses of all managing agents. This allows the retrieval of information by a managing agent as well as a capability to monitor their performance, Dvorkin explained.

However, the most important feature of the service, the DP manager explained, is the availability of data to managers who handle the actual investment of premiums and pension funds.

The structure of the data base allows information to be accessed in different ways.

The Tymshare service also provides a cash flow acquisition model that calculates a rate of return on properties that Equitable might want to purchase. The model can project a 30-year cash flow of all income and expense categories and, according to Dvorkin, has eliminated the need for manual preparation of spread sheets as part of the appraisal process.

The model can help Equitable obtain an above-average rate of return on its investments, he said.

The Tymshare service has also reduced the turnaround time on quarterly reporting. Because the former batch system could not handle appraisal information, the market value reports were prepared manually at the end of a quarter. Now the information is input directly into the DSS and the reports are produced by the system.

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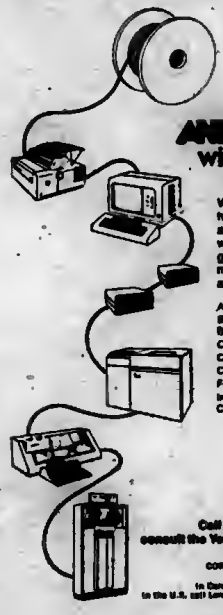
INDIANAPOLIS — International Computer Programs, Inc. (ICP), a publisher of software product and service information, announced that the 11th Annual ICP Million Dollar Awards Ceremony and ICP Executives Conference will be held in Scottsdale, Ariz., April 1-2 at Marriott's Mountain Shadows.

Guests speakers at the conference will include Daniel Fylstra, chairman of Personal Software, Inc.; Burton Grad, president of Heights Information Technology Services, Inc.; Eugene Bolokh, senior consultant with Besoft Consultants; Oliver Wight, president of Oliver Wight, Inc. and Manufacturing Software Systems.

A panel discussion on advertising of software products and services, international marketing, financial market trends and editorial perspectives on the future of software will be included in this year's conference.

Additional information on registration is available from International Computer Programs, 9000 Keystone Crossing, Indianapolis Ind. 46240.



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Time Crucial Element

Oil Rig Servicer Strikes Pay Dirt With Package

HARVEY, La. — A firm here that services the generators needed to operate off-shore oil rigs in the Gulf of Mexico decided to purchase packaged software for use with its new automated accounting system.

Because the Reagan Equipment Co.'s data processing staff consisted of only four people — two trained data processing specialists, a computer operator and an assistant — timing proved to be a critical issue. Robert Stoltz, manager of computer operations and programming for Reagan, recommended that the company purchase packaged computer software that could be easily modified to suit its needs.

"We were coming from a service bureau and had never used packages before. But we decided that the only way to get the accounting system operating within a year was to buy packaged software," Stoltz said.

Basic Requirements

Stoltz, after realizing the number of software packages available, limited the field to those that met certain basic requirements: those developed for Burroughs Corp. systems that also utilized Burroughs' DMS II data base and those using Cobol coding. He found that few packages met all the requirements, and of those that did, the software developed by Lawson Associates, Inc. of Minneapolis was chosen.

"Lawson's general accounting software was one of the only ones that made full use of the DMS II data base capabilities. And the source code is included in the package price, which helps to simplify modification.

"We installed the packages ourselves using Lawson's phone support. We had no problems during installation at all. Lawson then sent its people here for three or four days to answer our staff's questions and train them to use the new packages," he said.

Stoltz said the structured Cobol coding helped make modifications more simple and more effective. "The structured Cobol code means that all programs in all modules are consistent. You know what is there before you start, which minimizes errors," he said.

Package modifications are made via Lawson's phone support service, he explained. "Their personnel will go through the modification with me line by line and point out potential problem areas. That way, we don't waste time and money developing an unworkable modification."

The general ledger and accounts payable modules were purchased in late July 1980 and running by November 1980, including modifications to the accounts payable system. In January 1981, Lawson delivered the payroll system and a customized job cost accounting system (designed and programmed by Lawson) that ran parallel for four months.

"We had the payroll and job cost accounting system in test mode for four months because we were running 30 to 40 programs. We only had minor, easily corrected problems," Stoltz said.

Stoltz said that no problems have arisen even though Reagan Equipment is based in Louisiana and Lawson is headquartered in Minneapolis. "Some of Lawson's Dallas people are developing a custom sales forecast system in our offices, while some of their Minneapolis people are developing a custom accounts receivable system up there. We have had no communication problems at all. We have always been given excellent, dependable service. Geographic distance doesn't pose any problems," he said.

"Lawson's packaged software has helped us to make better use of our data base and equipment in a cost effective and 'behind the scenes' manner," Stoltz said.

DPMA Expands Video Courses

PARK RIDGE, Ill. — The Data Processing Management Association (DPMA) has added three new videotape programs to its educational library for free use by its chapters.

The videotapes include "DP Quality Assurance," "Motivating the Data Processing Professional" and "Interfacing Word Processing and Computer Technology."

More information is available from DPMA International Headquarters, 505 Busse Highway, Park Ridge, Ill. 60068.

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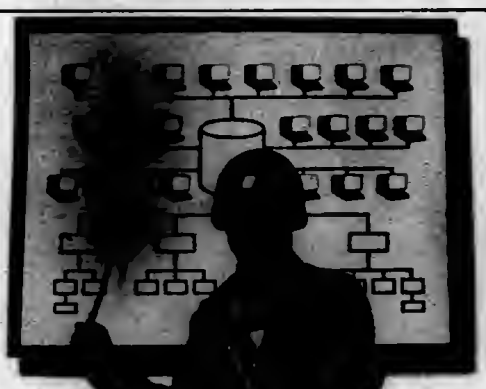

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Calendar

March 10-12, Washington, D.C. — **Distributing Systems: Effective Approaches and Applications.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

March 11, Anaheim, Calif. — **California Computer Show.** Contact: Norm De Nardi Enterprises, 95 Main St., Los Altos, Calif. 94022.

March 16-17, San Francisco — **Selecting a Local Network.** Contact: Architecture Technology Corp., P.O. Box 24344, Minneapolis, Minn. 55424.

March 16-18, Denver — **Project Leadership Workshop.** Contact: BSI, 4720 Montogomery Lane, Bethesda, Md. 20814.

March 16-18, Anaheim, Calif. — **Software/Expo-West.** Contact: Software/Expo-West, Suite 400, 222 W. Adams St., Chicago, Ill. 60606.

March 16-18, New York — **Tools for DP Training: From Planning to Performance.** Contact: Richard Peres, Director of Marketing Services, Edutronics/McGraw-Hill, 1221 Ave. of the Americas, New York, N.Y. 10020.

March 16-18, Teaneck, N.J. — **DOS/JCL.** Contact: Q.E.D. Information Sciences, Inc., Q.E.D. Plaza, 180 Linden St., P.O. Box 181, Wellesley, Mass. 02181.

March 16-19, Chicago — **Structured Systems Design.** Contact: Jim Highsmith, Ken Orr and Associates, Inc., 715 E. 8th, Topeka, Kan. 66607.

March 17-19, Washington, D.C. — **Computerized Building Control Systems.** Contact: The George Washington University, School of Engineering and Applied Science, Washington, D.C. 20052.

March 17-19, Amsterdam, Holland — **Ink Jet Printing.** Contact: Institute for Graphic Communication, Inc., 4th Floor, 375 Commonwealth Ave., Boston, Mass. 02115.

March 17-19, San Francisco — **DP Operations Today: Effective Scheduling and Console Operation.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

March 17-19, San Francisco — **Planning for Office Automation: Concepts and Practices.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

March 17-19, Chicago — **Basic: An Introduction to Computer Programming for Managers.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

March 17-19, Chicago — **Minicomputer Systems: Guidelines for Successful Selection, Acquisition & Operations.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

March 17-19, Washington, D.C. — **Computer Performance Measurement and Capacity Planning.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

March 17-19, Dallas — **Systems Analysis and Design: Concepts and Effective Practice.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

March 17-19, Washington, D.C. — **Decision Support Systems.** Contact: U.S. Professional Development Institute, 12611 Davan Drive, Silver Spring, Md. 20904.

March 18, Washington, D.C. — **Federal Datapoint Users Group.** Contact: Administrative Division, U.S. Geological Survey, National Center — MS 206, 12201 Sunrise Valley Drive, Reston, Va. 22092.

March 18-19, New York — **Data Communications: Advanced Concepts and Systems.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held March 18-19 in San Francisco.

March 18-19, Houston — **Design Professionals Computer Users' Conference.** Contact: Design Compudata Exchange, 45 Van Brunt Ave., Dedham, Mass. 02026.

March 18-19, San Francisco — **Advanced Software Validation Techniques.** Contact: Software Research Associates, P.O. Box 2432, San Francisco, Calif. 94126.

March 18-19, San Francisco — **Automated Software Engineering Tools.** Contact: Software Research Associates, P.O. Box 2432, San Francisco, Calif. 94126.

March 18-19, San Francisco — **Software Quality Assurance Technology.** Contact: Software Research Associates, P.O. Box 2432, San Francisco, Calif. 94126.

March 18-19, Houston — **Breakthroughs in Design Firm Automation.** Contact: Richard C. Vendola, Design Compudata Exchange, 45 Van Brunt Ave., Dedham, Mass. 02026.

March 18-19, Denver — **Developing and Implementing Purchase Order Management Systems.** Contact: Sylvia Vogelman, Center for Retailing Management, 425 Park Ave., New York, N.Y. 10022.

March 18-19, Washington, D.C. — **Computer Graphics: Technology & Applications.** Contact: Eloise Wenker, National Computer Graphics Association, 20033 M St., N.W., Washington, D.C. 20036.

March 19, London — **The 11th Annual International Computer Programs, Inc., Million Dollar Awards Ceremony & Directories.** Contact: Carol Stumpf, 9000 Keystone Crossing, P.O. Box 40946, Indianapolis, Ind. 46240.

March 19-21, Hong Kong — **Computer Hong Kong '82.** Contact: Kallman Associates, 5 Maple Court, Ridgewood, N.J. 07450.

March 20, San Francisco — **DL/1 Programming (IMS/VS DB) Workshop.** Contact: Expertise Extension Workshop, 220 N. Glenoaks Blvd., Burbank, Calif. 91502.

March 20, Los Angeles — **CICS/VS Advanced Control Recovery & Debugging Workshop.** Contact: Expertise Extension Workshop, 220 N. Glenoaks Blvd., Burbank Calif. 91502.

March 20-22, Charleston, S.C. — **Association of Information and Dissemination Centers' (Asidic) 1982 Spring Meeting.** Contact: Jeanette Webb, Asidic Secretariat, P.O. Box 8105, Athens, Ga. 30603.

March 21-24, San Francisco — **University Computing Co. 1982 Software Users Conference.** Contact: University Computing Co., Exchange Park, Dallas, Texas 75235.

March 22, Syracuse, N.Y. — **The Human Side of Systems 1982.** Contact: Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138. Also being held March 23 in Louisville, Ky., and March 24 in Youngstown, Ohio.

March 22-23, Washington, D.C. — **The Emerging Telecommunications Marketplace.** Contact: Phillips Publishing, Inc., Suite 1200N, 7315 Wisconsin Ave., Bethesda, Md. 20814.

March 22-24, Denver — **Successful Program and Project Management.** Contact: The Institute for Professional Education, Suite 303, 1515 N. Court House Road, Arlington, Va. 22201.

March 22-24, Boston — **Design of On-Line Systems.** Contact: Q.E.D. Information Sciences, Inc., Q.E.D. Plaza, 180 Linden St., P.O. Box 181, Wellesley, Mass. 02181.

March 22-24, New York — **Investigating Word Processing.** Contact: American Management Associations, 135 W. 50th St., New York, N.Y. 10020.

March 22-24, Chicago — **National Conference on Information Systems Education.** Contact: Conference Manager, U.S. Professional Development Institute, Inc., 12611 Davan Drive, Silver Spring, Md. 20904.

March 22-24, Chicago — **Information Systems Education Conference.** Contact: Information Systems Education Conference, 12611 Davan Drive, Silver Spring, Md. 20904.

March 22-24, Sunnyvale, Calif. — **MVS Systems Management Workshop.** Contact: Sondra Schwartz, Boole & Babbage Educational Services Division, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

March 22-24, San Francisco — **Distributed Systems: Effective Approaches and Applications.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

March 22-24, San Francisco — **Data Base Management Systems: A Comparative Analysis of General-Purpose Systems.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

March 22-24, Chicago — **Data Base Management Systems: General Concepts and Guidelines.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

March 22-24, Washington D.C. — **Telecommunications Management.** Contact: Seminar Deptartment, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

March 22-24, Washington D.C. — **Structured Testing.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

March 22-24, Atlanta — **Evaluating and Selecting Computer Software Packages.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

March 22-24, Washington, D.C. — **Computer Performance Evaluation.** Contact: George Washington University, School of Engineering and Applied Science, Washington, D.C. 20052.

March 22-24, Boston — **SNA Architecture and Implementation.** Contact: Communications Solutions, Inc., Suite 205, 10062 Miller Ave., Cupertino, Calif. 95014.

March 22-24, Chicago — **Information Systems Education.** Contact: Data Processing Management Association, 12611 Davan Drive, Silver Spring, Md. 20904.

March 22-25, Denver — **CICS/VS Application Design.** Contact: National Software Enterprises, Inc., 310 W. Lake St., Elmhurst, Ill. 60126.

March 22-25, Dallas — **Interface '82, Data Communications & Beyond.** Contact: Interface '82, 160 Speen St., P.O. Box 927, Framingham, Mass. 01701.

March 22-25, Denver — **DOS/VSE Vsam for Cobol Programmers and Vsam for Cobol Programmers.** Contact: Software Information Services, P.O. Box 4132, Bellevue, Wash. 98009.

March 22-25, Washington, D.C. — **Design of Digital Control Systems.** Contact: George Washington University, Continuing Engineering Education, Washington, D.C. 20052.

March 22-25, New York — **Planning a Digital Data Acquisition & Control Computer System.** Contact: Rae D'Amelio, Program Coordinator, Union College, Office of Continuing and Graduate Studies, Wells House, 1 Union Ave., Schenectady, N.Y. 12308.

March 22-25, Columbus, Ohio — **IBM DOS/VSE and DOS/VSE.** Contact: Goal Systems International, Inc., P.O. Box 24981, Columbus, Ohio 43229.

(Continued on Page 38)

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(Continued from Page 37)

March 22-26, Washington, D.C. — **Workload Analysis & Forecasting.** Contact: Institute for Software Engineering, Suite 200, 535 Middlefield Road, Menlo Park, Calif. 94025.

March 22-26, Kansas City, Mo. — **Systems Analysis Workshop.** Contact: BSI, 4720 Montgomery Lane, Bethesda, Md. 20814.

March 22-26, Washington, D.C. — **Structured Analysis Workshop.** Contact: Structured Methods, Inc., 7 W. 18th St., New York, N.Y. 10011.

March 22-26, Minneapolis — **Analysis/Design Workshop.** Contact: Structured Methods, Inc., 7 W. 18th St., New York, N.Y. 10011.

March 22-26, Washington, D.C. — **Computers/Graphics in the Building Process.** Contact: World Computer Graphics Associations, Inc., Suite 250, 2033 M St., N.W., Washington, D.C. 20036.

March 22-26, Boston — **Information Engineering Revolution.** Contact: Information Methods (USA) Corp., 504 Totten Pond Road, Waltham, Mass. 02154.

March 22-26, San Francisco — **Structured Analysis, Specification and Design Workshop.** Contact: Dr. Ned Chapin, Infosci, Inc., Box 7117, Menlo Park, Calif. 94025

March 22-26, New York — **Information Analysis.** Contact: Information Methods (USA) Corp., 504 Totten Pond Road, Waltham, Mass. 02154.

March 22-26, San Francisco — **Data Administration: Development and Practice.** Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

March 23-25, Orlando, Fla. — **Southcon/82 High-Technology Electronics Exhibition and Convention.** Contact: Electronic Conventions, Inc., 999 N. Sepulveda Blvd., El Segundo, Calif. 90245.

March 23-26, Topeka, Kan. — **Structured Requirements Definition.** Contact: Jim Highsmith, Ken Orr and Associates, Inc., 715 E. 8th, Topeka, Kan. 66607.

March 24-25, Cary, N.C. — **SAS Color Graphics Course.** Contact: SAS Institute Inc., P.O. Box 8000, Cary, N.C. 27511.

March 24-25, Cary, N.C. — **SAS Basics Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

March 24-25, Washington, D.C. — **Paperless Office.** Contact: Workshop Administrator, Micronet, Inc., Watergate Mall, 2551 Virginia Ave., N.W., Washington, D.C. 20037.

March 24-26, Pittsburgh, Pa. — **Vsam Peformance Workshop.** Contact: Solutions, Inc., Box 989, Montpelier, Vt. 05602.

March 24-26, Chicago — **EDP Quality Assurance.** Contact: Data Processing Management Association, 12611 Davan Drive, Silver Spring, Md. 20904.

March 24-26, Chicago — **Second National Symposium on DP Quality Assurance.** Contact: Symposium Manager, U.S. Professional Development Institute, 12611 Davan Drive, Silver Spring, Md. 20904.

March 24-26, Stanford, Calif. — **Visual Display Terminals: Windows into the Information Age.** Contact: Coordinator, Stanford Conference on Visual Display Terminals, Pine Hall, Stanford University, Stanford, Calif. 94305.

March 24-26, Hamilton, Bermuda — **Computing 82.** Contact: The Computer Society of Bermuda, P.O. Box 1479, Hamilton 5, Bermuda.

March 25-26, Sunnyvale, Calif. — **IMS Systems Management Workshop.** Contact: Sondra Schwartz, Boole & Babbage Educational Services Division, 510 Oakmead Parkway, Sunnyvale, Calif. 94086.

March 25-26, Washington D.C. — **Computing Standards for Military and Aerospace Applications.** Contact: Education Foundation of Data Processing Management, Department CSC, Suite 1016, 5959 W. Century Blvd., P.O. Box 91295, Los Angeles, Calif. 90045.

March 28, Saddlebrook, N.J. — **Retail Pharmacy Computers.** Contact: Sylvia Vogelman, Center for Retailing Management, Lebhar-Friedman, Inc., 425 Park Ave., New York, N.Y. 10022.

March 29-April 2, Cleveland — **Structured Analysis Workshop.** Contact: Structured Methods, Inc., 7 W. 18th St., New York, N.Y. 10011.

March 29-April 2, Los Angeles — **Structured Analysis/Design Workshop.** Also being held in New York, March 29. Contact: Structured Methods, Inc., 7 W. 18th St., New York, N.Y. 10011.

March 29-April 1, Chicago — **National Design Engineering Show & Conference and the National Plant Engineering & Maintenance Show & Conference.** Contact: Clapp & Poliak, Inc., 245 Park Ave., New York, N.Y. 10167.

March 29-April 1, Chicago — **Computer Contracts.** Contact: The Registrar Brand Consulting Group, Inc., 1775 Broadway, New York, N.Y. 10019.

March 29-April 2, Los Angeles — **James Martin Seminar: The Fourth-Generation Methodologies.** Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

March 29-April 2, College Park, Md. — **Advances in Computer Systems Security.** Contact: UCLA Extension, 10995 Le Conte Ave., Los Angeles, Calif. 90024.

March 29-April 2, Topeka, Kan.— **Structured Systems Design/Struc-**

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tured Program Design Combined Course. Contact: Jim Highsmith, Ken Orr and Associates, Inc. 715 E. 8th, Topeka, Kan. 66607.

March 29-April 2, Denver — **IBM S/370 Assembler Language Workshop.** Contact: Steve Comstock, 256 A S., Monaco Pkwy., Denver, Colo. 80224.

March 29-30, St. Louis — **Robotics: Fundamentals and Technology of Computerized Robots.** Contact: Martha K. Fort, Arts & Sciences Continuing Education, 105A Humanities-Social Sciences Building, University of Missouri-Rolla, Mo. 65401.

March 29-30, Boston — **Managing Documentation & Documentation Standards.** Contact: Carnegie Press Center for Documentation Resources, 100 Kings Road, Madison, N.J. 07940.

March 29-30, St. Louis — **Industrial Application of CAD/CAM & Computers.** Contact: Eloise Wenker, National Computer Graphics Association, 2033 M Street, N.W., Washington, D.C. 20036.

March 29-30, New York — **Fundamentals of Data Processing and Telecommunications.** Contact: National Institute for Management Research, P.O. Box 3727, Santa Monica, Calif. 90403.

March 29-30, San Francisco — **Data Dictionary/Directory Systems: Evaluation and Selection.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

March 29-31, New York — **Word Processing II.** Contact: National Institute for Management Research, P.O. Box 3727, Santa Monica, Calif., 90403.

March 29-31, Sunnyvale, Calif — **MVS Systems Management Workshop.** Contact: Sondra Schwartz, Boole & Babbage Educational Services Division, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

March 29-31, Salt Lake City, Utah — **Jovial--Ada Users Group.** Contact: Paul C. Wood, Sperry Univac, DSD, P.O. Box 3525, MS U2P14, St. Paul, Minn. 55165.

March 29-31, San Francisco — **Design Seminar Workshop.** Contact: Jane Crosswhite, Oberland Associates, 4036 N.E. Sandy Blvd., Portland, Ore. 97212.

March 29-31, Washington, D.C. — **National Conference Communications: Implementing Integrated Information System.** Contact: U.S. Professional Development Institute, 12611 Davan Drive, Silver Spring, Md. 20904.

March 29-31, New York — **Teleprocessing Software: An Introduction and Selection.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

March 29-31, New York — **Systems Analysis and Design: Concepts and Effective Practice.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

March 29-31 New York — **Advanced DP Management: Methods and Techniques in the 80's.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

March 29-31, San Francisco — **Data Security Implementation and Management.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

March 29-31, San Francisco — **DP Project Management: A Practical Approach.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

March 29-31, Chicago — **Information Systems Planning: A Structured Approach.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

March 29-31, Washington D.C. — **DP Operations Today: Effective Scheduling and Console Operations.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

March 29-31, Washington D.C. — **Introduction to Micro/Personal Computers: Application, Selection and Usage Guidelines.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

March 29-31, Dallas — **Data Communications: Effective Network Design.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

March 29-31, Dallas — **Introduction to Word Processing: Concepts, Systems and Application.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

March 30, New York — **National On-Line Meeting.** Contact: Learned Information, Stokes Road, The Anderson House, Medford, N.J. 08055.

March 30, Las Vegas — **Infocom '82.** Contact: IEEE Computer Society, P.O. Box 639, Silver Spring, Md. 20901.

March 30, Edmonton, Alta — **Managing and Motivating DP People.** Contact: Carrie Solomon, 4810 Montgomery Lane, Bethesda, Md. 20814.

March 31-April 1 — San Francisco — **Using Computer Graphics: Techniques, Systems and Applications.** Contact: Seminar Dept., Datapro Research Corporation, 1805 Underwood Blvd., Delran, N.J. 08075.

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EDITORIAL

What's Causing the Slack?

Is top management growing less receptive to proposals from DP managers for equipment procurements? An Arthur D. Little, Inc. executive recently called underinvestment in DP a national problem that leads to rampant obsolescence in many users' facilities [CW, Feb. 15].

Martin Buss, an Arthur D. Little consultant, said users should fight obsolescence and limited capacity for in-house systems development by purchasing more prepackaged software. But such canned applications software may still burden users with the need for staff training, revision of documentation and file conversions, he pointed out.

If a decline in enthusiasm for DP procurements is really a solid trend with top management in U.S. companies, what accounts for it? External economic conditions might be one answer, but the main reason for the trend, if it exists, could also be top management's experience within the company itself.

A half-dozen stages in the evolution of systems within organizations are named in a popular model conceived by former Harvard Business School Prof. Dr. Richard Nolan. Fluctuation in top management's enthusiasm for implementations is suggested by the labels for stages in Nolan's model, including: Initiation, Contagion, Control and Integration [CW, Dec. 28/Jan. 4].

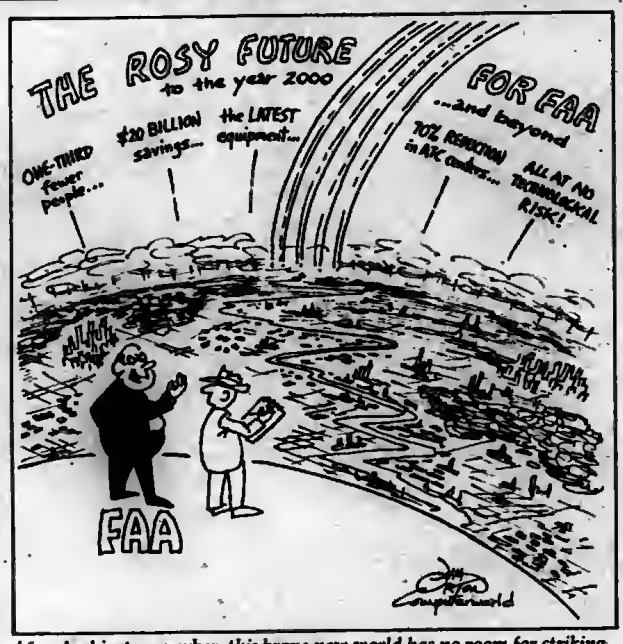
After the honeymoon period Nolan calls Initiation, systems fever becomes so "contagious" that a third stage, Control, crops up so top management can try pulling the reins in on the corporate DP department. Could the problem identified by Buss reflect a third-stage status for implementations in most U.S. businesses?

If so, DP managers should recognize that they may be viewed more as agents of problems than as agents of solutions by the highest placed executives in their companies. A prudent strategy for coping with this image would be for DP managers to regularly offer plans by which top management could attain more control over the cost and direction of implementations — in end-user departments as well as in the DP department itself.

Where cost is concerned, DP managers should recognize that DP budgets, disbursement logs, installation bills and outlays for maintenance do not show the full monetary investment and impact of implementations. Whenever a system forces a company to revise policy or procedures, or to restructure reporting relationships and control of data resources, "shadow" costs of significant proportion inevitably result — giving top management more to worry about.

That is why top management, end users and DP professionals must work together on systems development and implementation projects, so top management does not feel the DP staff is springing anything suddenly and end users have time to prepare for the impacts of systems.

Where top management does not recognize its responsibility for participation in major DP upgrades, perhaps it's time for the DP manager to find a new job elsewhere.



"... And just remember, this brave new world has no room for striking controllers either!"

DATA PAST

Five Years Ago
Feb. 28, 1977

WASHINGTON, D.C. — The Federal Communications Commission decided not to recommend the breakup of AT&T because a six-year investigation had not uncovered "substantial" evidence of unfair practices to prevent competition. At the same time, however, the regulatory agency said the Bell system could be "even more responsive to consumer needs."

Ten Years Ago
Feb. 23, 1972

SAN FRANCISCO — IBM was restrained by a federal district court here from discontinuing maintenance on computer systems with extended core memories manufactured by Advanced Memory Systems, Inc.

The move came shortly after IBM sent letters to users of Data Recall core extensions withdrawing the IBM maintenance support.

LETTERS

Conflicting Interests

In a letter to the editor [CW, Jan. 25], Joseph Leubitz attempts to show there is no loss of independence when a certified public accountant firm that advises clients also sells DP services to the same clients. I believe I can show that any consultant who advises a client on his needs for DP services has conflicting interests if the consultant also offers these same DP services for sale.

If Leubitz claims he does not advise his clients specifically on DP services, I believe I can still show conflicting interests.

Let us suppose a client was a major user of Leubitz's DP services, such that withdrawing would put Leubitz out of business. Wouldn't that tend to compromise his independence in auditing that client?

L. Kurt Engelhart
Principal
L.K. Engelhart Associates
San Francisco, Calif.

Added Perspectives

Please allow me to share some added perspectives regarding "One User, Two Systems: Boon and Bane" [CW, Jan. 25].

The Telecommunications Division of Rolm Corp. has purchased 20 Data General Corp. computers since the division's inception in 1975. The article, in effect, gave the impression that Rolm was running two groups of Data General MV/8000 systems in parallel for possible comparison or field trial purposes.

In reality the two systems described in the article are being used for two different applications and the one with which we experienced trouble was a larger, very complex $600,000 system, probably the most powerful MV/8000 in use today. This is not a fair comparison.

While we did experience problems with the one system, the equipment is performing well now and the early problems have been rectified.

We put a lot of pressure on Data General to deliver the system quickly, with much more memory, communications equipment and peripherals than other systems. Problems can (and do) happen with any computer system. We have recently placed an order for another MV/8000 for an additional critical application.

The opinions expressed in the article attributed to a Rolm employee were those of an individual talking about his isolated and unique problems and do not reflect the opinion of Rolm Corp.

We understand that these things happen on occasion, but we want your readers to know that Rolm enjoys a good relationship with Data General and other computer manufacturers.

Wayne Mehl
Vice-President and General Manager
Telecommunications Division
Rolm Corp.
Santa Clara, Calif.

Insurance Industry Issues

Thank you for the three articles relating the computer industry to the insurance industry ["Insurers Linking Up With Agents," "Insurer Plans Earth Station" and "Insurance Policy Offered to Protect DP Professionals," CW, Jan. 25].

I hope your newspaper will continue to report on developments of the Insurance Institute for Research, as well as other computer-related issues in the insurance industry.

Oveta Popjoy
DP Educational Coordinator
Maryland Casualty Co.
Baltimore, Md.

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READER COMMENTARY / Robert W. Howe

Data Center Recruitment: An Image Problem?

Hardly a data center exists that is not suffering a shortage of programmers, and all indications are that the shortage will continue throughout the 1980s.

Changes in recruiting and retention policies have enabled some data centers to maintain a staff capable of systems support with some left over for project development.

However, most data centers still possess a significant backlog of project work for which no programming resources are available.

Problem of Supply Only?

Is the problem of recruiting at the data center one of limited supply only? I suggest not. With an unlimited spectrum of potential employers, programmers often view the data center environment as nonconducive to career growth.

The problem basically lies in the image of the data center as a place where maintenance takes priority over development, thereby stagnating the innovative talents of the aggressive programmer.

Although this perception can clearly be rebutted by the positive development programs in place at many data centers, the fact remains that when faced with the option of accepting a data center position vs. a position with a software development firm, the development firm more often than not will come away with the prize.

Since it will take time and effort to improve the recruiting capabilities of the data center, what is the data center to do in the interim? A contract programming service is one avenue open to data center management.

Although there are as many different types of contract programming specialists as there are shells on the seashore (for instance, financial, retail, systems, inventory and so on), the majority would fall under three distinct categories of support:

- The straight hourly rate contract provides a specific programming resource to the data center manager to be used on whatever projects he desires. Responsibility for managing the resource rests with the data center and contracts are usually measured in time or completion of assigned task.
- The project hourly rate contract is similar to the above with the exception that the involvement is generally geared to a specific project and the resources are usually managed by the outside software firm.
- The fixed-bid contract provides for a specific bid price on an individual project based on time and materials. In this type of contract, the outside software firm will usually manage the resources assigned since the contract does not allow for delays in project delivery.

Each of the above has certain characteristics that must be examined by the individual data center manager to determine which best suits his type of operation.

The straight hourly rate contract provides software resources under the control of the data center manager for use on whatever projects he decides to assign them. This gives the manager a certain degree of flexibility and control and also allows him direct evaluation of the individual's productivity.

On the other hand, the data center manager must weigh the dangers of:

- Having the individual constantly reassigned to projects before any are completed (a common problem at data centers where development resources are often reassigned to firefighting roles, thereby guaranteeing delays in project development schedules).
- Having this individual working hand in hand with the data center employees who are often making considerably less on an hourly rate, thus leading to possible personnel problems.
- Taking on the additional management responsibility over an individual who is not technically an employee of the company and who, in fact, may be working for other companies at the same time.

The project hourly rate contract has most of the characteristics of the straight hourly rate contract with two important exceptions.

First, the resources provided are geared to the delivery of a specific project (though not necessarily for a fixed fee), and second, the project resources are managed by the software firm and not by the data center.

This approach ensures that resources assigned to the project are not redirected during the life of the project and also relieves the data center manager of the additional management responsibility. The data center manager, however, must ensure that productivity measurement criteria have been agreed upon with the software firm so that control is not lost as the project moves toward completion.

'The fixed-bid contract offers the data center manager all of the advantages of the previous two alternatives and, in addition, provides precise financial control.

'The software company offering fixed-bid contracts will normally provide project specifications and time tables for deliverables, as well as a fixed price for the delivery of the project.'

Advantages of Fixed-Bid

The fixed-bid contract offers the data center manager all of the advantages of the previous two alternatives and, in addition, provides precise financial control. The software company offering fixed-bid contracts will normally provide project specifications and time tables for deliverables, as well as a fixed price for the delivery of the project.

Any overruns in time estimates for implementation are the responsibility of the software company. It is for this reason that the data center manager may find that many software companies are reluctant to bid on a fixed-fee basis.

One of the additional advantages of the fixed-bid contract is that many data centers are now contracting with their customers for specific software development projects, which are funded separately by the customer.

In these cases, the use of the fixed-fee contractor can ensure that these projects can be accommodated without disruption to the data center staff and perhaps, more importantly, will be done within budgetary restrictions.

Finally, the fixed-bid contract provides the data center manager a vehicle through which he can accurately measure the costs of project development — a task that is often impossi-

(Continued on Page 42)

HUMAN CONNECTION / Jack Stone

DP-Style Catch-22 Envelops End Users

These days, it's hard to believe that an organization with an annual budget of $100 million can be perceived as a low-priority user by its ADP department, but this certainly appeared to be the case in the Education and Cultural Affairs Directorate (ECA), a division of the U.S. International Communications Agency (Usica).

Ira Schoen was the ECA management analyst who was saddled with the tough job of bringing automation to ECA office operations.

In addition to his unfulfilled expectations of support from the "computer folks," he felt handicapped by his limited knowledge of computer-based business systems.

Even though he was an end user/recipient of batch process reports, nearly all the members of the ECA professional staff felt the same way.

'DP-Style Catch-22'

Even worse, Ira believed that he and the staff were forever doomed to business systems ignorance due to a situation that might be termed "DP-style Catch-22." Here's how Ira described it:

"Shortly after I joined the executive office in November of 1980, Tom Leydon, our executive director, told me to take the necessary steps with our ADP group to review our batch-oriented mainframe systems and develop recommendations for upgrades to on-line systems.

"He indicated that ECA management dissatisfaction with the systems had become intense and immediate action was required.

"Then, at one of our early meetings, DP management dropped this 'bomb': 'We certainly want to help you, but, if you're really serious about upgrading your mainframe systems, you'd better plan on waiting for one to two years.'

"There was no way we could accept this schedule — we needed a new system right then and there. Shortly thereafter, the DPers suggested a Wang OIS 130 as an interim solution and then proceeded on a systems study to determine the specific information needs to be met by both the interim and long-term systems.

"The DP analyst produced a workplan in February of 1981, identifying

Part 2 of a Continuing Series

the usual steps that are performed in a systems development program: 'Element Need Statement,' analysis of current systems, design of new system, implementation, installation and conversion. It sounded great — very professional and well-planned.

"The Element Need Statement was delivered in May and was well received by ECA management. During its development, numerous interviews of ECA staff personnel were conducted, current systems were looked at and we had ample opportunity to comment.

"A few weeks later, eagerly waiting to proceed to the analysis phase of study, we received a call from the ADP group telling us that the analyst was pulled off the job and assigned to a 'higher priority' systems effort.

"We were also told that our program was deferred until August, when a new analyst would be assigned. Then in August we were told that our program was delayed indefinitely because the ADP analysts couldn't very well argue with the agency's DP priorities, so, in effect, we were left abandoned.

"Needless to say, we were unhappy. If there had been any way possible for us to perform the analysis and design work, we would have done so. But how could we? We didn't have the training and the expertise. We could not see any easy way for us to acquire it in the short run.

"Here's where the catch comes in: The reason we are inexperienced is that the ADP organization has not given us the training and expertise we need.

"And the reason that the DPers have not received the training and the expertise is that we are so inexperienced that we place too much of a demand upon their technical resources!"

LETTERS

'Enough Is Too Much!'

Enough is too much already! I have been reading your yellow journal rumors and half-truths too long. The cartoon on the editorial page by Jim Orton [CW, Feb. 1] criticizing the Justice Department's dropping of the IBM suit was too much.

In the past 17 years at IBM, I have held several marketing, headquarters and information systems positions. Ethical business conduct and fairness have always been stressed and enforced by my employer. That was the reason I came to IBM and a major reason I am still there.

Apparently you can't stand the fact that even the government was persuaded that its case was vacuous. The injustice is that the case was begun at all and that it was protracted so long.

There are other, more objective publications to which I can subscribe. You would do well to conduct your business on as high an ethical plane as does IBM.

Kenneth L. Plog
Rhinebeck, N.Y.

DP Must Share the Blame

In the article "Critical Programmer Shortage Predicted by '90" [CW, Feb. 1], the writer reviewed a speech given by James Homet of Coopers and Lybrand to the New York Financial Writers Association.

In the speech, Homet was bemoaning the lack of well-trained computer programmers both now and projected for the future. He directly blamed the educational system for affording low salaries for instructors that results in poor training of students.

I submit that the blame lies not with the educational system, but in good part with the data processing profession itself. Managers make two requirements of new hires — they must have a four-year degree and they must have several years experience.

We run a highly successful program at 916 Vo-Tech in White Bear Lake, Minn., for the purpose of training computer programmers, operators and data entry operators. Students are well-trained, the faculty is competent, equipment and techniques are state-of-the-art.

But the students obviously graduate without on-the-job experience and most of them do not have four-year degrees.

Many businesses in the Twin Cities area require one or both of these and students therefore cannot even get an interview. It's the age-old question: I can't get a job without experience, but how do I get experience without a job?

I recommend that companies who seriously wish to add well-trained programmers to their staff consider the schools in their area and maintain a certain percentage of entry-level jobs to hire the graduates of those programs. They and James Homet might be surprised at the quality they'll discover.

Cynthia Roos
DPO Coordinator
Special Intermediate School District No. 916
White Bear Lake, Minn.

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CW

Recruitment Problems

(Continued from Page 41)

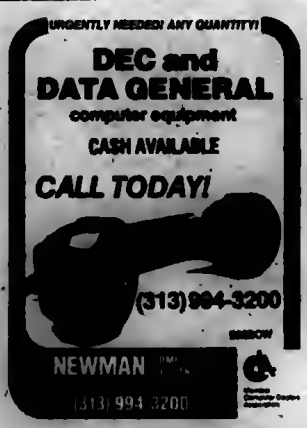
ble when the same resources are often assigned to multiple projects simultaneously. Each of the three approaches outlined above can be an effective tool for supplementing the software resources of the data center. The data center manager must also, once he has determined the approach most suited to his needs, ensure that the contractor selected is experienced, responsible and has the depth of resources to deliver on his commitment.

The growing requirements for increased software support will continue to drain the resources of the data center manager.

Improving the image of the data center as a challenging environment for programmers to develop, implementing more effective recruiting and retention policies and enhancing the productivity of the software staff are all recognized as effective means for dealing with the increased demands for software development at the data center.

The intelligent use of contract programming services in a controlled environment represents an equally valuable alternative for the data center manager to consider.

Howe is president of Atlantic Data Services, Inc., a software development firm in Quincy, Mass.



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LETTERS

Frightening Issue

Jack Bologna'a reader commentary "Computer Matching vs. Privacy" [CW, Feb. 2] was interesting and informative. It was also frightening.

Bologna discusses the age-old bureaucratic approach of attacking the little problem because it doesn't know how to attack or solve the big problem. It has always been so, and I don't see it changing. It'a human nature. We all do that sort of thing.

Spending millions and making a major effort to catch the "little thief" while ignoring the big problem is not done deliberately to punish anyone. If it were deliberate, then it could be altered and corrected.

It's worse. It's the way big systems operate and even though countless individuals are hurt, it just rolls on. It'a like an avalanche. You can see it coming, but you won't stop it by standing in front of it and shouting "halt." It will just roll over you and go on as before. It'a the nature of the thing.

Bologna said at the end of his fine article: "I'm sure we could come up with a better answer, a more rational one, if we set our minds to it." I fully agree with him. However, who is going to "set his mind to it?" and where, when and how?

Our privacy can now be abused because it is possible to abuse it due to the available computer data base systems. In my opinion, it has hardly started.

George Orwell's "1984" is only two years away. When all sorts of private information is readily available in a large data base, someone — sooner or later — will call for and use this information.

And for who knows what reason? As the mountain climber said: "I go up the mountain because it is there."

That's reason enough for some people. Why? Beats me, but it's true.

William A. Delaney
President
Analysis &
Computer Systems, Inc.
Bedford, Mass.

'Another Acronym'

Werner L. Frank's "Computerese and Communications Confusion" [CW, Jan. 18] was the most refreshing article I've read in a long time.

It atruck a cord. Somebody else has perhaps the same pet peeve that I have: acronyms! Not all acronyms, mind you, but definitely those used redundantly.

For example, "MRP planning," "POS sale terminal" or "ETA time of arrival." Afterall, what does material requirements planning planning really mean?

And, curiously enough, I have also had a problem with understanding the acronym OEM. Usually, I hear these folks referred to as "OEM manufacturers." But I have always had to stop and think, "who is doing what?"

As a matter of fact, my pet peeve overwhelmed me one day to the point that I felt the world needed another acronym. So I set about creating one.

In no time at all my desk pad looked like I had failed a spelling test. But I did it! I created an acronym!

My acronym is "AA." By itself it doesn't look too original, but it has a distinct advantage. It puts me near the beginning of any alphabetical listing.

But what does it stand for, you ask? What else? Another Acronym. But what does it mean? Well, I don't know just yet; it depends on what the application is when I need it.

John Thome
Project Leader
Management Information Systems
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SEE PAGE 18

'Datavantage' Helps Create And Manage IMS Testing

RIVER EDGE, N.J. — On-Line Software International has announced Datavantage, which is designed to assist the data base administrator or testing control group in creating and managing complex test IBM IMS environments.

Datavantage reportedly ensures that all possible combinations of data are included in the test data base so the application on trial encounters every situation found in production. It is also said to help programmers manipulate the individual fields of a test data base with modification, insert and delete functions.

The software includes a logical data base compare facility, which examines the before and after image of the data base and shows programmers what changes the application made, the vendor said. It also is designed to save and restore multiple copies of the test data base in one central location.

Compatible with IMS DB/DC, CICS/DL/1 and IMS batch systems, Datavantage reportedly supports all OS/VS users. It carries an introductory price of $25,000, On-Line Software International said from 65 Rt. 4 E., River Edge, N.J. 07661.

Data Management Benchmarks Swing Widely in CPU Costs: Study

By Lois Paul
CW Staff

STAMFORD, Conn. — The total CPU cost of running a benchmark set covering all facets of data management can range downward from nearly $1,200 to less than $75, a comparative analysis of 25 data management and data base management systems by Real Decisions Corp. (RDC) has found.

The first edition of the firm's newest report, "Data Management Decisions," contains information on 25 systems (see box) taken from questionnaires and a benchmark problem set. The report is intended to create a method of comparison and to allow in-depth analysis of systems based on actual usage, according to RDC. It also includes profiles of the software product, author and vendor.

The wide range in CPU costs (more than 16:1) in using data management systems on time-sharing systems was a major finding of the report. In addition to the CPU cost results, the report pointed to the significant differences between systems in such areas as the amount of technical expertise and coding necessary, the range of options when defining the data structure, overall package design and integration and general product evolution.

SYSTEM	SUBMITTED BY
Accent-R	Rapidata, Inc.
AP*Plus DMS*	STSC, Inc.
Datasys*	DTSS, Inc.
DBMS-10	Rapidata, Inc.
DMS*	General Electric Information Services Co.
DPL	National Information Systems
DRS*	Advanced Data Management
Focus	Information Builders, Inc.
Info*	Henco, Inc.
Ingres*	Relational Technology, Inc.
Intec	Ross Systems, Inc.
IPL	ADP Network Services, Inc.
Magnum*	Tymshare, Inc.
Manage	Computer Sciences Corp.
Nomad2	National CSS, Inc.
Oliver	On-Line Systems, Inc.
Oracle	Relational Software, Inc.
Questor	Comshare, Inc.
Ramis II	Mathematica, Inc.
Rapport*	Logics, Inc.
Seed*	International Data Base Systems, Inc.
Shell*	Time Sharing Resources, Inc.
Strategem*	Integrated Planning, Inc.
System 2000*	Intel Corp.
X/L	Control Data Corp.

*Partial submission

Real Decisions Corp. Chart

The Data Management and Data Base Management Systems Covered in the RDC Report

The findings on the CPU cost differential were derived from an analysis of the results of benchmarks run on 13 data management systems, according to RDC. Based on problems that require the building and maintenance of a personnel data base, the report compared the overall capabilities of systems and tracked the CPU costs incurred by each system as it implemented the data base, performed queries and manipulated data and produced reports.

A breakdown of costs revealed that implementing the data base, which involves data base design and load and includes different validation criteria, ranged from $788.58 to $54.92, with an average cost of $304.22, according to the report.

Costs for query/manipulation tasks ranged from $601.18 to $6.34, with an average cost of $230.21 for completing all 14 queries, the report indicated. These tasks included: record locations and displays, screening, simple statistics, "what-if" analysis, "low hit" and "high hit" updating, transaction processing and ad hoc interactive updates.

For example, when the 13 systems were asked a "what-if" question, the CPU costs ranged

(Continued on Page 48)

Seven Integrated Modules

Package Manages Distributed IDMS

NAPERVILLE, Ill. — DBMS, Inc. has announced Maximum, a software package designed to manage the distributed application environment using both Cullinane Database Systems, Inc.'s IDMS/CICS and IDMS-DC on IBM and plug-compatible mainframes.

Release 1 of Maximum consists of seven integrated modules. The Printer System is designed to define and control the printers, operators and terminals that comprise a teleprocessing network. The Security System provides control of network access, including an audit facility.

The Tele-Comm System reportedly provides an electronic mail system integrated with a user's existing teleprocessing network. The Inter-Doc System is said to provide system and user documentation and training aids to the user's terminal display. The Job-Que System is designed to allow non-DP professionals to submit and monitor predefined batch job streams.

Network Analysis allows management of active network terminal sessions. Message Switching provides system management with broadcast-type communications with network operators, according to the vendor.

The entire Maximum package is priced at $30,000. Individual subsystems are priced as follows: Printer, $10,000; Security, $12,500; Tele-Comm and Inter-doc, $7,500 each; and Job-Que, $5,000. The expanded Network Analysis and Message Switching are not priced individually, but are included in the total system cost.

DBMS, Inc.'s corporate offices are at 1801 A Mill St., Naperville, Ill. 60540.

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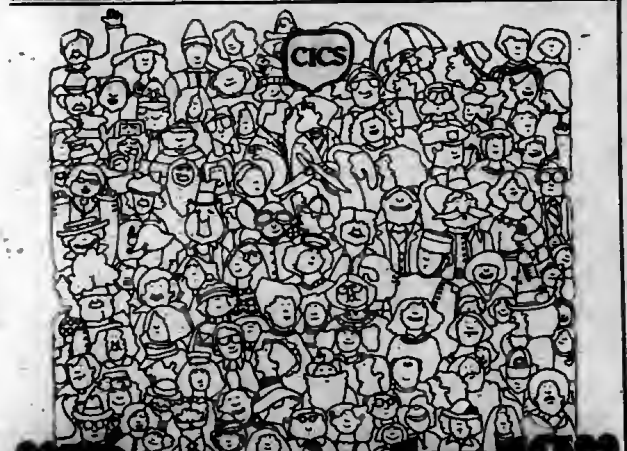

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'Easytrieve' Facility Oriented To Application Development

OAK BROOK, Ill. — Pansophic Systems, Inc. has developed an extended facility of its Easytrieve package called Pro/grammer, which it said is oriented to the development of complete application systems for users of IBM and plug-compatible systems.

Pro/grammer reportedly provides for the creation of an executable module, expanded development aids, synchronized processing for any number of files and a facility for managing work files without requiring additional JCL.

The software is said to include the ability to catalog a program in executable form to allow production execution; debugging facilities, such as data and logic maps; a logic-trace feature and statement number diagnostics at Abend; and compile listing options to enhance the readability of documentation.

The facility allows for automatic report formatting based on the requirements of the application, the vendor said. In addition, facilities are provided for added control by the user to prescreen records selected for report processing and to perform table search, special calculations and specialized annotations at the following times. This occurs before and after each line is printed, before and after each control break, at the end of each page and at the end of the entire report.

Pro/grammer's spool file concept is designed to allow programs to create a series of reports with one pass of the input data. The Virtual File Manager, another application development aid included in Pro/grammer, is intended to provide an efficient access method that processes program work files.

This extended facility of Easytrieve is available to current Easytrieve users at $12,500 for the IBM DOS version and $15,000 for the OS version. Pansophic Systems is headquartered at 709 Enterprise Drive, Oak Brook, Ill. 60521.

Benchmark Cost Varies Widely

(Continued from Page 47)

from $201.53 to $1.09, with the average figure being $38.50, the researchers noted.

In the benchmarks which exercised each system's method of producing reports, the overall cost for four reports varied from $170.44 to $11.02, with an average cost of $96.26, according to RDC. Report requirements included the generation of multiple reports, complex formatting, retrieval from multiple files and cross-tabulation and user prompting.

The minimal differential between high and low CPU costs for any of the 19 benchmarks was computed by the report to be a factor of 14:1.

The largest variance spotted by the report occurred in one of the query tasks, which showed a cost differance of 450:1. In the report sector the greatest cost difference was a factor of 35:1.

The report also revealed differences in the benchmarks within each vendor's system. For example, over 60% of the systems that have costs in the highest quarter of the group for one of the 19 benchmarks also shows costs in the lowest quarter for at least one other benchmark run.

RDC concluded from the benchmark results that costs are closely tied to the capability being exercised by a particular benchmark task. In order to clarify each system's approach to problem solution, the report therefore presented actual run displays that were annotated to facilitate comparisons between systems. Displayed for each benchmark run on each system were the commands used, the amount of coding required and the resulting output.

Of the 25 systems analyzed, 21 indicated the relational method as an available data base structure, 15 mentioned the hierarchical structure and 12 listed the network structure. The RDC analyst noted that the new breed of relational systems may put to rest the argument that relational systems entail a large amount of processing overhead. Benchmark results derived using one of these systems indicated great cost affectiveness.

The RDC report is available for $995, which includes one update in mid-1982. RDC is at 123 High Ridge Road, Stamford, Conn. 06905.

'OLPDT' Update Aids NRC VRX

MINNEAPOLIS — Century Associates, Inc. has announced a version of its On-Line Program Development and Testing (OLPDT) system that is said to offer password security and word processing.

Version 17 includes enhancements for users of NCR Corp.'s VRX and B3 operating systems. VRX users can now limit the number of jobs that will pass to the VRX operating system at any one time, the vendor said.

Other added functions include the ability to put data cards into catalog jobs for testing purposes, outputting a VRX Cobol source program and the ability to look into the OLPDT workfile to see how much space is available.

Version 17 costs $375/mo or can be purchased for $9,500 from the firm at 8120 Penn Ave. S., Minneapolis, Minn. 55431.

Package Performs Statistical Analysis

AUSTIN, Texas — Aims Plus, Inc. has announced a statistical analysis package for users of the firm's Aims-03 information management system.

Stat Plus, an add-on module for Aims-03, runs on the Wang Laboratories, Inc. 2200 series. Hard disk-based, Stat Plus requires 28K bytes of memory. A 2200 running Stat Plus reportedly can be driven by a few special function keys to analyze any Aims-03 data base according to preset user criteria.

Stat Plus costs $1,000 from the vendor, 5000 E. Ben White Blvd., Austin, Texas 78741.

'Condor' Update Provides Support For IPO/E

CULVER CITY, Calif. — Phoenix Computer Corp.'s Condor, an on-line program development package for IBM and plug-compatible mainframes running under DOS, has been enhanced to provide support for IBM's System Installation Productivity Option/Extended (IPO/E).

Release 5.1 of Condor reportedly replaces IBM's interactive computing and control system as the on-line program development system. The vendor said that DOS/VSE sites now using the tailoring, service and feature installation tasks of the System IPO/E can do so using Condor.

A Condor user reportedly can invoke the services of the VSE/Interactive Productivity Facility (IPF) or the VSE/Interactive Problem Control System (IPCS) from the Condor terminal. The dialogue that occurs during a terminal session — system prompts, commands and user response — is unchanged when running IPF and IPCS under Condor.

Condor support for System IPO/E is available for DOS/VSE Release 2 and later versions, the vendor said, noting that there is no additional cost for current Condor customers. For new purchases of Condor Release 5.1, the price ranges from $14,500 to $18,500. The higher price includes the vendor's library support, Canlib, which costs $4,000.

Phoenix Computer Corp. is located at 11949 Jefferson Blvd., Culver City, Calif. 90230.

'Prosper' Offers Job Control

SAN FRANCISCO — A scheduling and production control package for IBM and plug-compatible mainframes, which was designed to improve computer data center productivity by automating critical operations functions, has been introduced by On-Line Business Systems, Inc.

Called Prosper, the software reportedly automates job scheduling, submission and restart/recovery; provides access to pertinent information about production jobstreams; allows for the development of uniform and up-to-date documentation for production jobs; and permits data center management to simulate work loads in advance.

Principal Features

Two principal features of Prosper are full-screen text editing capability and a data base that serves as a reference point for the implementation and maintenance of a production system, the vendor said.

Prosper is said to be composed of the five integrated subsystems: a job scheduling facility, a job-stream construction facility, a job-stream submission facility, a submission summary report and an interactive recovery facility.

The cost of a perpetual license for Prosper, which is available immediately, is $25,000, the vendor said from 115 Sansome St., San Francisco, Calif. 94104.

'Roscoe' Update Supports SPF

PRINCETON, N.J. — Applied Data Research, Inc. has announced a version of its Roscoe on-line programming system for IBM OS/VS environments that supports IBM's System Productivity Facility (SPF) on IBM and plug-compatible mainframes.

TSO Services

The release reportedly allows a site to move development and maintenance activities from SPF under TSO to SPF under Roscoe without disruption or retraining its terminal user community. SPF provides menu- and screen-handling services for TSO.

The vendor claimed that Roscoe consumes, on the average, only 25% to 30% of the CPU and storage resources of TSO. Therefore, a typical SPF installation would be able to support three to four times as many SPF terminals with Roscoe than with TSO.

Roscoe/SPF is based on the SPF menu-driven environment, the vendor explained, and includes a replication of TSO/SPF menu options; a tutorial that can be reached at any level, as well as from the main option screen..

The permanent license for MVS Roscoe costs $40,500, ADR said from Rt. 206 and Orchard Road, CN-8, Princeton, N.J. 08540.

SAS/FSP Runs on IBM Machines

CARY, N.C. — SAS Institute, Inc. has announced SAS/FSP, a full-screen product for data entry, query search and file retrieval that runs on IBM 360, 370, 4300 and compatible machines.

SAS/FSP provides interactive, menu-driven facilities to SAS users with IBM 3270 or compatible CRT terminals. Screens can be defined to look like invoices, according to the vendor.

The license for SAS/FSP costs $5,000 the first year and $2,500 the following year, the vendor said. SAS Institute is headquartered at SAS Circle, Box 8000, Cary, N.C. 27511.

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'Ezlog' Offered For VAX/VMS LOGIN

SANTA BARBARA, Calif. — Signal Technology, Inc. has announced Ezlog, designed as an extension to the Digital Equipment Corp. VAX/VMS LOGIN procedure, which reportedly allows the user to specify the project or cost center to charge for each LOGIN session or batch job.

In addition, an optional second level of password protection is available, the vendor said, and unsuccessful LOGIN attempts are recorded.

It reportedly combines with the vendor's Process Accounting and Chargeback System (Pacs) to enable detailed accounting of the use of the computer. Ezlog enables users to explicitly specify what project they are working on, the vendor explained.

Reportedly, projects can have their own password, disk files are easily separated by project or user and LOGIN failure data includes port and user name. In addition, the system manager is required to authorize fewer user names and can delegate control of projects to project leaders.

The software is designed to address the needs of DEC VAX installations when individual users wish to spread their computing charges over several different projects or cost centers, the vendor said.

Ezlog is available only in conjunction with Pacs. Supported single-CPU licenses cost $4,900 for Pacs and $2,200 for Ezlog. These are said to include full documentation, installation procedure, one year of maintenance and update service for both packages. Additional unsupported single-CPU licenses are available at $2,940 for Pacs and $1,320 for Ezlog.

The vendor is headquartered at 15 W. De La Guerra St., Santa Barbara, Calif. 93101.

VAX Gets Finance Tool

HANOVER, N.H. — Lupfer and Long, Inc. has announced that its financial analysis and reporting system, Spread, is available for the Digital Equipment Corp. VAX-11/750 and 780. Spread is a module of the company's Count Integrated Financial System (Count/IFS).

Spread is designed to allow financial managers to examine alternative solutions to complex business problems, the vendor said. It can be used for budget preparation and analysis, variance reporting, cash flow projections, pro forma reporting and more.

The software is available on other DEC systems and systems from other companies. For the VAX systems, it costs $1,600.

Lupfer and Long, Inc., Computer Consulting Service, can be reached through Box A-57, Hanover, N.H. 03755.

With Structured Framework

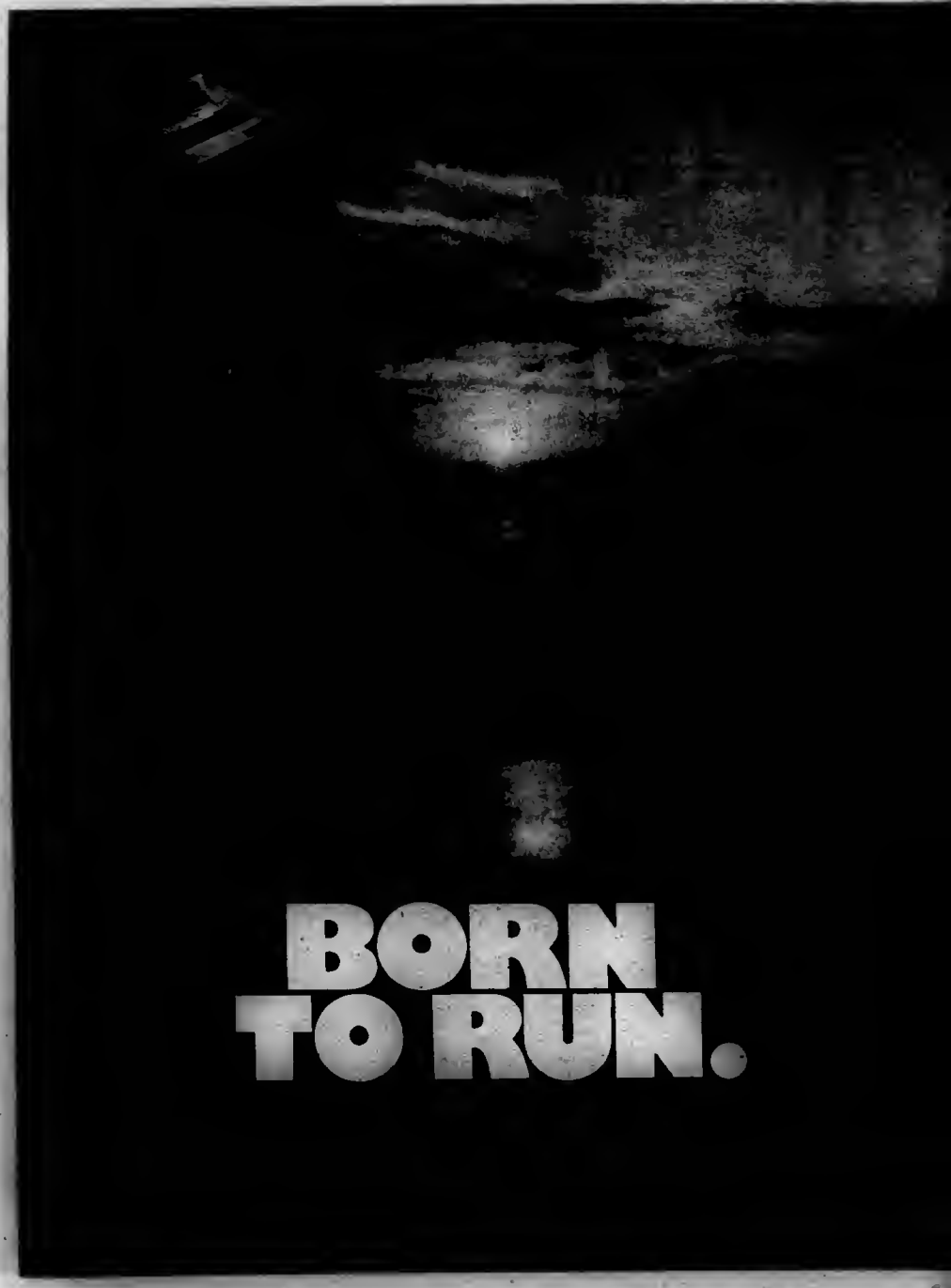
Development Tool Out for VAX-11

DENVER — Interactive Software Systems, Inc. has announced an application development tool designed to provide a structured framework from which new applications on Digital Equipment Corp. VAX-11 systems running under VAX/VMS can be designed, programmed, documented and maintained.

ADT-11 reportedly includes a fully integrated data dictionary that provides a centralized, unique description of all data files, records, data elements and on-line application screens. A Basic program generator is available to build new application programs from a standard program layout and also provides an interface to the data dictionary.

The software is said to provide data access utilities, which can perform data entry and maintenance; general inquiry; and a full-function report generator for any data file that has been described in the data dictionary.

ADT-11 is priced at $12,000 and further information can be obtained by contacting the Interactive Software Systems at P.O. Box 3314, Englewood, Colo. 80155.



'Explore/Discover' Updated

COLUMBUS, Ohio — Goal Systems International, Inc. has announced a new release of its software performance monitor.

Explore/Discover is said to provide DOS/VS(E) users with facilities for monitoring and controlling their computer's operating environment, as well as making available real-time reports and histogram reports. Release 3.6 introduces four major facilities: shared direct-access storage device, real-time deactivation report, job execution monitor and loop detection.

Available for general distribution in April, the software is available now for a 30-day free trial period. Its purchase price is $4,125. Goal Systems can be reached at P.O. Box 29481, Columbus, Ohio 43229.

DG Puts 16-Bit Business Basic On 32-Bit Eclipse MV/8000, 6000

WESTBORO, Mass. — Data General Corp. has announced that its 16-bit Business Basic programming language is available on its 32-bit Eclipse MV/8000 and MV/6000 systems running under its Advanced Operating System/Virtual Storage (AOS/VS).

With Business Basic-16, multiple users reportedly can simultaneously program, test, debug and execute programs. Its extensions include multiple-keyed Isam files, dynamic record allocation, six-character variable names, common area and direct I/O block.

Business Basic-16 is said to include features to minimize program development time and to increase productivity and efficiency. These include random or sequential access to information in files, independent of the physical location of the information in the file; a file-maintenance package for simultaneous creation, modification and access to user files by multiple users; and utilities enabling file sorting, index building, initializing and printing, variable renaming and documentation generation.

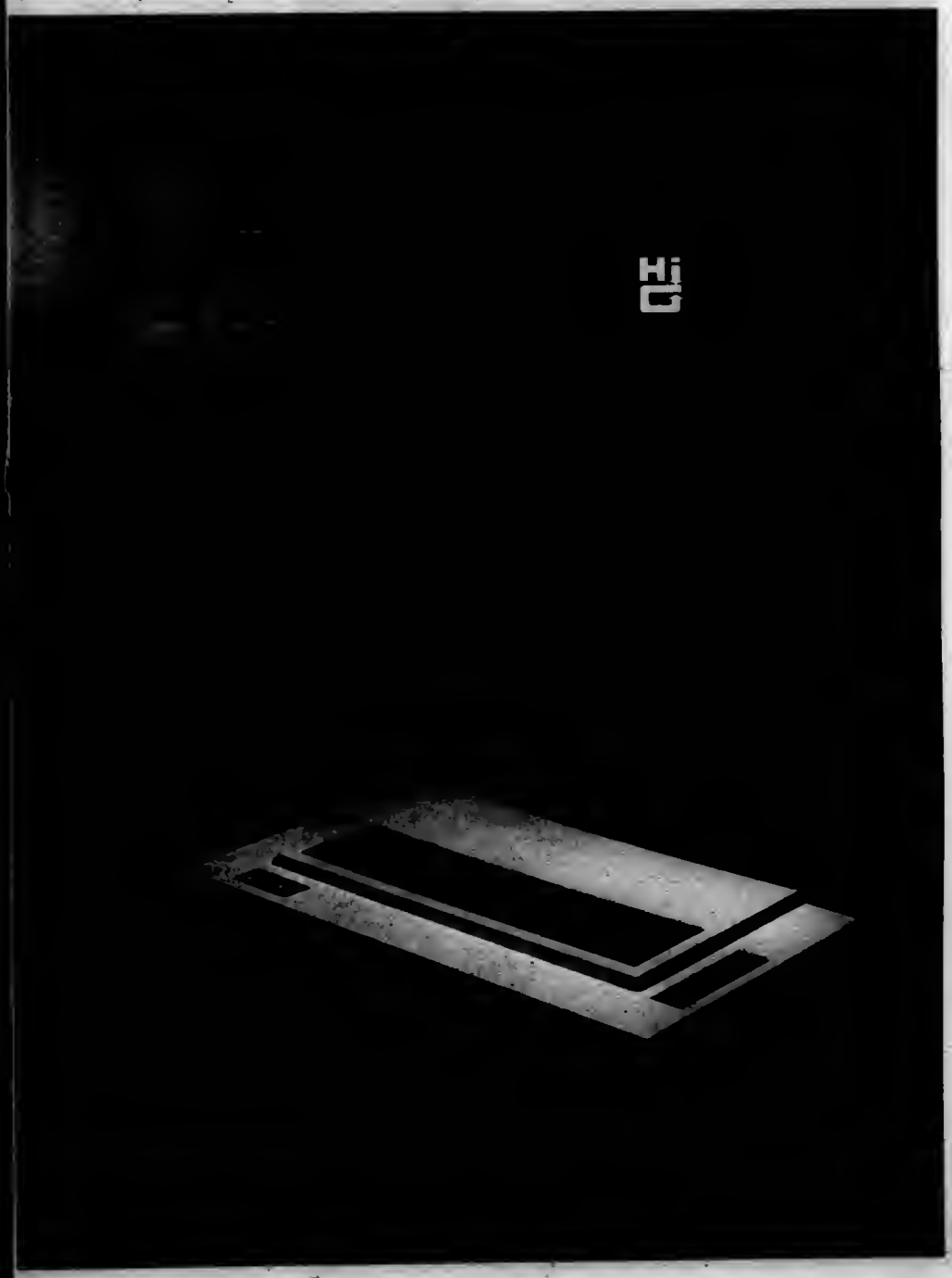
The initial license fee for Business Basic-16 on AOS/VS systems is $6,995, which includes training credits, installation, software subscription service and support and software trouble report. The subsequent license fee is $4,595, the vendor said from 4400 Computer Drive, Westboro, Mass. 01580.

Hospitals Get Account System

NEW YORK — Corporate Time-Sharing Services, Inc. has added a fiduciary accounting system, the Patient Accounting Control System (Pacs), which can be used in hospitals, nursing homes, state-supported institutions and companies providing their employees with a payroll savings plan.

The package runs on equipment from Honeywell Information Systems, Inc. The price is $4.50/patient/mo.

Pacs provides 10 report and analysis modes and is available from Corporate Time-Sharing Services, 30 Rockefeller Plaza, New York, N.Y. 10112.



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'Control/IMS' Products Get Fast Path Feature

SUNNYVALE, Calif. — Control/IMS and Control/IMS Realtime now will support IBM's IMS Fast Path feature, Boole & Babbage, Inc. announced here.

Both Control/IMS products with the Fast Path feature are designed to report on all modes of operation, including standard and batch message processing; and Fast Path message-, driven-, nonmessage driven-, utility- and mixed mode processing.

Control/IMS reportedly captures data on every Fast Path transaction, program and data base. It provides data reduction and summarization capabilities that allow long-term storage and trending of complete IMS work load information.

In addition to including Fast Path data in the current reports, Boole & Babbage said that new reporting capabilities unique to Fast Path are available, such as a transaction processing report showing Fast Path resource usage and plots over time of balancing group activity and other Fast Path indicators.

Control/IMS Realtime reportedly now includes Fast Path data in its current displays, as well as in several new displays unique to Fast Path, such as Fast Path buffer pool activity, Vsam Control Interval and latch contentions and balancing group queuing.

In addition, the asynchronous services option of Control/IMS Realtime now supports Fast Path monitoring and automatic early warning, the vendor said, and has been enhanced with several asynchronous monitors unique to Fast Path that report on transactions queued and processed by balancing group and Fast Path buffer utilization.

The Fast Path support option to Control/IMS or Control/IMS Realtime costs $15,000. Control/IMS and Control/IMS Realtime sell for $25,000 and $30,000, respectively. They operate under MVS for IMS/VS DB/DC Version 1.1.5 and later releases, the vendor said from 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

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Power/VS, CICS Users Get Utilities

ORANGE CITY, Iowa — Two utility packages for users of IBM's CICS and Power/VS have been introduced by R. Buckley & Associates.

The first routine reportedly consists of an interface that allows the user to pass a command that is identical in format to the CEMT facility available in CICS VS Release 1.5 from a batch partition for execution. This can be used for closing files and disabling transactions, recreating the file in a batch partition and opening the files and enabling the transactions without any need to shut down CICS or have any manual interventions from an operator.

The second routine is used to pass a VSE Power command to the Power/VS command processor to be executed, the vendor explained. This is accomplished by placing the command and operands in the Comm-area and issuing the EXEC CICS LINK command. This routine reportedly makes possible several techniques that can increase ease of operation in a CICS environment.

These programs are written in assembler and shipped on 9-track 1,600 bit/in. tape immediately upon receipt of payment. The price for a permanent license for both routines is $950. The vendor can be contacted at RR#2, Box 190, Orange City, Iowa 51041.

System/34 Gets Business Tools

STONY BROOK, N.Y. — A business software package based on the IBM System/34 has been developed by Heineck Associates, Inc.

Biz-5000 includes billing, inventory control, accounts receivable, sales analysis and mailing list capabilities, a spokesman said.

Requiring 64K bytes of core memory, the software costs $5,000 from the firm at One Carriage Court, Stony Brook, N.Y. 11790.

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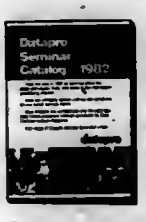

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Fortran Routines Run Encryption

PRINCETON, N.J. — The Princeton Software Co. has introduced a collection of standard Fortran subroutines to perform general purpose data encryption. The Data Security Facility (DSF) is available for any processor with a Fortran compiler.

The DSF implements the federal Data Encryption Standard in a set of interfaces. DSF can perform a 64-bit encryption or decryption in 2.1 msec, the vendor said.

The DSF software is available on a perpetual source license basis for $2,500 or on a monthly basis for $200 from the vendor at P.O. Box 1317, Princeton, N.J. 08540.

Software Piracy Prevention Service Based on Patented Way of Using DES

ANNANDALE, Va. — A software piracy prevention service based on a patented method of using the U.S. government-approved Data Encryption Standard (DES) was introduced here by Advanced Computer Security Concepts, Inc. The vendor said that instead of attempting to prevent software duplication, its service validates software at its initiation and also dynamically during its operation.

Use of this method requires either a software DES implementation or the addition of a small board that is a hardware DES implementation to the equipment on which the program to be protected is being run, the vendor explained. Both the required hardware and software can be supplied by Advanced Computer Security Concepts.

The software protection reportedly consists of periodically authenticating cryptographically generated validation values that an unauthorized user cannot unscramble. In addition, the protection method can be modified to prevent changes to a software program.

The initial cost of the hardware DES implementation from Advanced Computer Security Concepts is approximately $500 for an end user. The software implementation for an end user is priced in the $750 range.

Once the hardware or software has been installed, protection of a software program is available for between $10 and $100 per program, depending on its size, the vendor said. In addition, there is a royalty fee payable to the vendor on a per-usage basis for protection of the program.

Advanced Computer Security Concepts is located at 4609 Logsdon Drive, Annandale, Va. 22003.

Now, it's just as simple to prevent access errors as it is to make them.

EDS

System Creates MAC Using DES

OAKLAND, Calif. — A software system for the generation of Message Authentication Codes (MAC) based on the National Bureau of Standards' Data Encryption Standard (DES) has been developed by Prime Factors, Inc.

Desmac is designed to be used for the validation of electronic funds-transfer automated teller machine and electronic mail communications. It may also be used to encrypt messages or on-site data.

The package is available for use on IBM mainframes and plug-compatibles, and Digital Equipment Corp. and Data General Corp. minicomputers. Mainframe perpetual licenses are $3,950 for the first CPU, $2,000 for the second, $1,500 for the third, $1,000 for the fourth to tenth and $750 thereafter.

Minicomputer license fees are $1,750 for the first CPU, with comparative quantity discounts, a spokesman said from 6529 Telegraph Ave., Oakland, Calif. 94609.

System/34 Gets Finance Tool

HILLSDALE, Ont. — Mervin G. Faulkner Associates Ltd. here has introduced a general ledger package for the IBM System/34. The package enables users to control all system functions, including control of the frequency of input and reports and the format of the financial statements, according to the vendor.

A provision of the system handles budgeting and distribution of overhead, a spokesman added. It has the ability to rerun the financial statements as many times as required to achieve clean statements.

A depreciation subsystem also is provided to keep track of all capital expenditures and to produce a depreciation schedule using the straight-line or declining-balance method.

Key features of the package are that it processes all transactions that influence inventory levels, such as receipts, issues, commitments and quantities on order, the vendor explained. Its reports include inventory master inquiry, items-ordered report, purchase order inquiry, inventory transaction report and below-order point.

The General Ledger package is priced at $5,000, the vendor said from 11 Mill St., Hillsdale, Ont. LOL 1VO.

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Micro Notes

Beginning this week, Computerworld will include information about selected microcomputer software packages in the Software & Services section. CW will cover only business-related general applications packages and systems software that a large company or an executive in a large firm would use. These include data base management systems, utility software, operating system software and generalized application software not tied to a specific vertical user market or targeted to small businesses.

Announcements of products that fit these criteria should be sent to Editor, Computerworld, P.O. Box 880, Framingham, Mass. 01701. The announcements should include the price of the product and the type of equipment on which it runs.

The microcomputer software column will not cover game software packages or software designed primarily for the home computer user or the small business user.

Ibase-1, an interactive data base management system designed for the IBM Personal Computer, is available from Intro-Logic, Inc. at 24700 Northwestern Highway, Southfield, Mich. 48075. The price is in the $2,000 range.

Version 2 of its Pascal compiler for the CP/M operating system was announced by JRT Systems, Inc., P.O. Box 22365, San Francisco, Calif. 94122. A single-user license is $295.

Superscreen, a package comprised of a word processor, a list processor and a spreadsheet calculator that is designed for Zilog, Inc. Z80 microcomputers is available from Creative Software Concepts, Inc., P.O. Box 349, Binghamton, N.Y. 13902. Superscreen is priced at $500.

A CP/M-based automated record-keeping package called the Small Records System was announced by Small Records Associates, Inc., P.O. Box 302, Lisle, Ill. 60532. It is available for $295.

IDM-1, consisting of a data base initialization program, a data base manipulation program, a report writer and a report generator, is available for users of IBM Personal Computers from Micro Architect, Inc., 96 Dothan St., Arlington, Mass. 02174. The price is $198, including a diskette, a user's manual and shipping costs.

OP1/Remote is a communications software package for use with Ontel Corp. OP1/50 and equivalent microcomputers. Designed to provide distributed processing to Burroughs Corp. users, the OP1/Remote software is available for $1,000, and a host version is priced at $1,500 from Eastham & Associates, 11246 Post Oak Road, No. 412, Houston, Texas 77035.

A **Metaforth cross-compiler** for CP/M or Cromemco, Inc. Cdos designed to produce 79-Standard Forth with an application on an 8080 or Zilog, Inc. Z80-based system is available from Inner Access Corp., 517-K Marine View, Belmont, Calif. 94002. The price is $450, and the software is available on either 5-in. or 8-in. diskettes.

A new version of the **DT/FPS** financial planning system designed for the Canon CX-1 desktop microcomputer is available from Desk Top Financial Solutions, Inc. Priced at $750, the package is available from the vendor at 407 Main St., Spotswood, N.J. 08884.

An automatic program generator written in assembly code for Radio Shack TRS-80 microcomputers is available from Roklan Corp. For the TRS-80 Models 1 and 3, Autogrammer is priced at $199.95. For TRS-80 Model 2 and a CP/M-based system, the price is $299.95. For the Atari, Inc. microcomputer, Roklan introduced a utility package, including a disk editor and a copy/verify format certifier for $29.95, and a telecommunications software package for $69.95. A 6502 Simulator package for Apple Computer, Inc. and Atari microcomputer systems is priced at $39.95. Roklan Corp. is located at 10600 West Higgins Road, Rosemont, Ill. 60018.

MDBS III, a data base management system for the Digital Equipment Corp. PDP-11 and 8- and 16-bit microcomputers, is available from Micro Data Base Systems, Inc., P.O. Box 248, Lafayette, Ind. 47902. MDBS III ranges in price from $1,500 to $13,000, depending on the configuration.

A data base manager, IDM-X, and a mailing list package, Mail-X, for use on Radio Shack TRS-80 Model II systems are available from Micro Architect, Inc., 96 Dothan St., Arlington, Mass. 02174. IDM-X is priced at $399 with a manual available for $25. The cost of Mail-X is $299, the manual costs $20.

A language processor called SMC Basic for the Zilog Corp. Z8000 system is available from SMC Systems and Technology, Inc., P.O. Box 6800, Bridgewater, N.J. 08807. The end-user price is $6,500 and dealer licenses are available.

'Data Ace' Boasts Operating System, DBMS

ANAHEIM, Calif. — Data Ace, a software package that reportedly includes a relational data base management system and an interactive, conversational operating system, was announced here by Global Data Corp. for users of Digital Equipment Corp.'s PDP-11/23 and Radio Shack Corp.'a TRS-80 systems.

Data Ace's four main functions, according to the vendor, are definition, inquiry, manipulation and editing. A demonstration diskette, a simplified guidebook and an on-screen help facility are reportedly included to enable even a non-DP professional to gain experience with the system.

The software's definition and inquiry functions are designed to enable users to complete a variety of business applications. The package also includes a manipulation function, which the vendor described as a self-programming language.

The vendor claimed that Data Ace contains features similar to IBM's Structured Query Language and Tymeshare, Inc.'s Magnum system.

Data Ace is available for $1,350, according to a vendor spokesman.

Global Data Corp. is located at 1911 Wright Circle, Anaheim, Calif. 92806.

Rexon Offers Enhanced 'Recap'

CULVER CITY, Calif. — Rexon Business Machine Corp. has introduced an enhanced version of the operating system software bundled with its small business computer system.

Rexon Comprehensive Application Processor (Recap) controls operation of Marathon computer systems hardware elements and the running of application programs, according to a spokesman.

Under Recap control, up to eight CRT terminals operating simultaneously can perform a mix of functions, the vendor said.

Recap is available with the Marathon system starting at $20,000 from the vendor at 5800 Uplander Way, Culver City, Calif. 90230.

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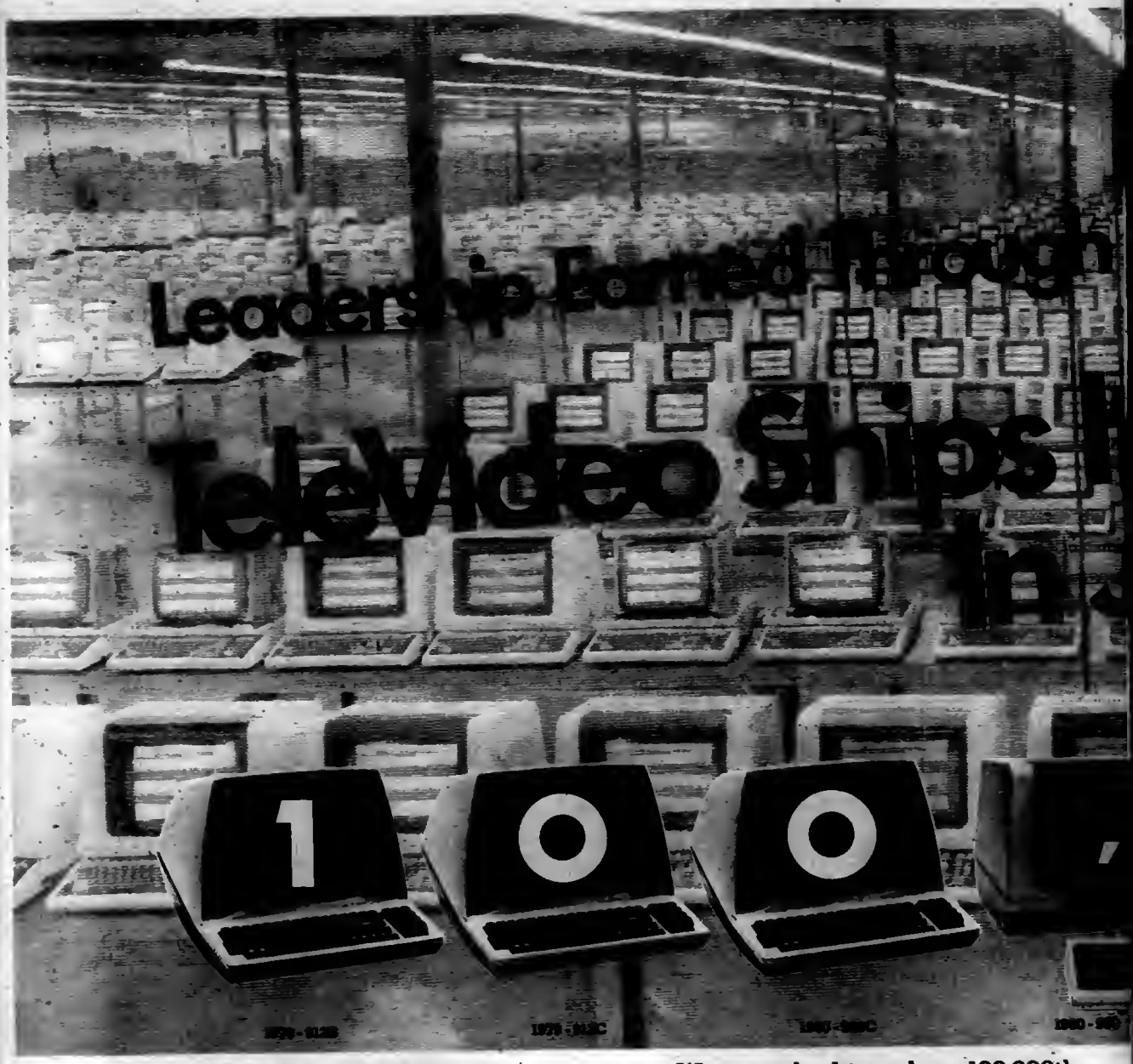

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System Design Aid Available For Honeywell Level 6, DPS 6

PHOENIX — Independent Computer Systems, Inc. has introduced ICS System Control, a system design aid for Honeywell Co. Level 6 and DPS 6 minicomputers. The ICS system is said to provide a structure that allows users to develop menu-driven, interactive applications.

Users are provided menu screens of transactions and applications and prompted to provide required data. Users may also plug existing applications into this structure, the vendor said.

The ICS Control System consists of five major subsystems: print spooler, menu driver, batch program structure, terminal security and control and backup reorganization.

ICS requires Honeywell Gcos, Mod400 and Vdam software. The purchase price is $7,000, the vendor said from Suite 106, 8686 N. Central, Phoenix, Ariz. 85020.

CDC Builds Program For IBM Series/1 Minis

MINNEAPOLIS — Control Data Corp. has announced a high-speed copy program designed for use with the IBM Series/1 minicomputer.

The software, designated the EDX V3 High-Speed Copy Program, reportedly allows data to be copied at the device, volume or data set level with minimal operator intervention. It also enables Series/1 users to create copies beyond the level of support offered by IBM EDX V3 software, such as at the device level or with absolute extents.

The copy program supports IBM standard interchange and extended format diskettes, either single or double density, in sector sizes of 128, 256, 512 and 1,024 bytes/sector, the vendor said.

The software is available for a $495 license fee from Control Data Corp., Miniperipheral Systems Division, 2200 Berkshire Lane N., Plymouth, MN 55441.

PDP-11 Users Get Payroll Package

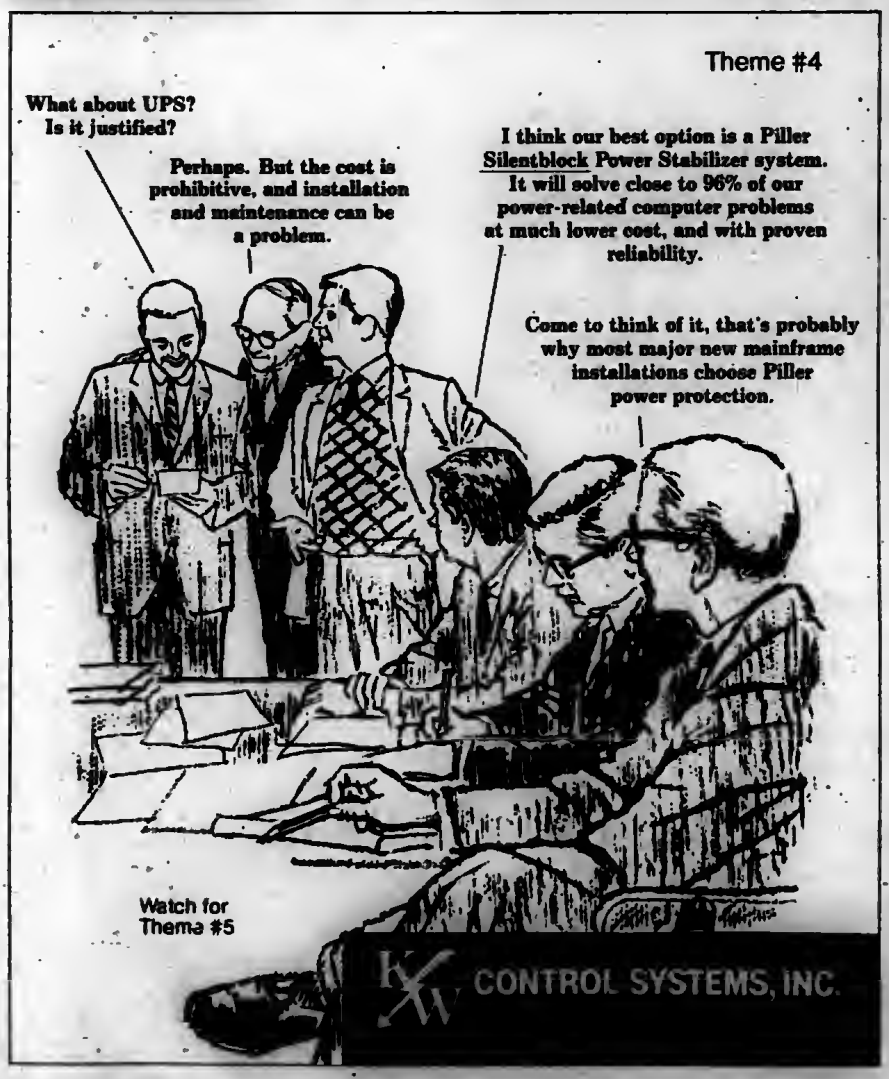
WRENTHAM, Mass. — World-Wide Computer Resources, Ltd. announced World-Pay, a dedicated payroll package for users of Digital Equipment Corp. PDP-11 systems.

World-Pay is said to offer multi-company, multidivision, concurrent hourly and salary payroll; a comprehensive tax table covering all 50 states with city and unemployment taxes where applicable; 11 deductions, including automatic bank deposits, two general ledger entries, month-to-date, quarter-to-date and year-to-date summary reports.

World-Pay, aimed at organizations that want to off-load the payroll function from the main computer, runs on any PDP-11, starting with the PDP-11/23. Its price begins at $5,000, from 15 Trafalgar Square, Wrentham, Mass. 02093

PILLER

POWER SYSTEMS FOR COMPUTERS



Fortran 77 Added To HP Desktops

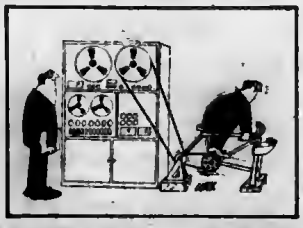
PALO ALTO, Calif. — Hewlett-Packard Co. has announced the availability of Fortran 77 on its desktop computers. The compiler is provided through the company's third-party software program, HP Plus.

The software reportedly allows applications written in Fortran to be transported to desktop computers. It allows about 80% of existing Fortran programs to be converted to the HP desktop computers, the vendor said.

Underlying the Fortran compiler is a Program Development System (PDS). It is a full operating system that includes a screen-oriented text editor, a graphics library, an HP-IB and general input/output library, plus a standard linker, loader and compiler/runtime support, the vendor said.

The software is available as part of the HP Plus program. The company includes the third-party distributed software in its price lists and sells the PDS package directly through HP's field sales organization.

The price of the software is $3,000 from Inquiries Manager, Hewlett-Packard, 1820 Embarcadero Road, Palo Alto, Calif. 94303.



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MAGNETIC MEDIA

WHAT'S AVAILABLE • WHAT'S IN STORE

IN 1980, SALES OF magnetic recording media for computer applications were approximately $1 billion and growing at an average rate of 25% per year. The need for various levels of storage capacity, access time and system cost and size has created a spectrum of devices, each with unique characteristics and media requirements. Inherent in all of them is a moving surface coated with a magnetic material that is used to store information in

This article is based on a report that is part of a soon-to-be published analysis of the magnetic media industry. Interviews and research involved the major manufacturers of media products, the manufacturers of the media substrates and major computing companies. Part of the study was conducted in conjunction with the graduate school of business at the University of Santa Clara, Calif.

The finished report, which will contain detailed profiles of seven companies, will be available from the Santa Clara Consulting Group, Suite 64, 50 W. Brokaw Road, Santa Clara, Calif. 95110. (408) 295-2460. Copyright applied for by Santa Clara Consulting Group.

IN DEPTH

the form of selectively magnetized spots.

Media products for computer data storage systems fall into two general classes: rigid and flexible. The rigid types consist of one or more aluminum disks coated with iron oxide, while the flexible media are some form of polyester or Mylar surface coated with iron oxide.

Rigid disks, introduced by IBM in the early 1960s, are packaged either singly or stacked to form multilayered disk packs. They are designed either to be removable from the drive unit or permanently mounted. The removable type provides the capability of storing information on multiple disks and of mounting a particular disk only when required. The diameter of removable rigid disks has been standardized at 14 in.

The permanently mounted or fixed disks are encapsulated and environmentally controlled, which allows the spacing between the recording head and medium to be reduced. This space reduction provides greater recording densities and increases the reliability of the storage unit. The majority of fixed disks produced today are typically referred to as "Winchester" disks after a phrase coined by IBM during their development. Fixed disks are produced in the U.S. in three sizes: 14-, 8- and 5¼ in.

Flexible recording media come in various sizes of tape and disks. The ½-in. tape reel is historically the industry standard. Introduced in the late 1940s by IBM, "mag tape" has continually been improved in capacity and reliability and is still the largest storage medium in use. The ½-in. magnetic tape is typically used in connection with large-scale and minicomputer systems. Magnetic tape is also available in ¼-in. cassettes for use with smaller systems ranging from minicomputers to tabletop calculators.

Rise of Floppies

Flexible disks, or "floppies," as they are typically called, were introduced by IBM in 1973 as a low-cost alternative to the more expensive rigid variety. They were quickly accepted because of their cost and rapid access time. Consequently, their use expanded to include microcomputer and small minicomputer systems.

IBM's original product was 8 in. in diameter, but the need for disks in conjunction with the smaller systems has resulted in a 5¼-in. flexible disk. Both sizes are now being produced and marketed.

The growth rate of each of these products vs. their respective share of the magnetic media market is presented in Figure 1. Half-inch tape and removable rigid disks dominate the market in terms of sales. Tape sales have experienced renewed growth because tape is being used for backup recording of information stored on Winchester fixed-type disk systems.

Sales of removable rigid disks have slowed considerably with the advent of the Winchester and floppy disks. These latter two products are receiving considerable attention because of their very high growth rate and large market potential. The floppy disk market will probably expand, by our calculations, to 425 million units by 1985 from the pressent 73 million. This increase represents a 42% compound growth rate.

Competing Companies

The industry has been dominated by three major companies with rather broad product lines. However, a number of smaller companies have specialized by focusing on narrow market segments and have achieved rather significant market shares.

The three dominant companies are IBM, 3M Co. and Memorex Corp. IBM and Memorex are heavily involved in ½-in. tape, floppies and rigid disks. IBM is the leader in 8-in. floppies, with 21% to 25% of the market, while Memorex leads the ½-in. tape segment with 22% to 27%. 3M is strong in both of these areas and also dominates the cartridge segment with 90% to 95% of the market.

Control Data Corp. is the leader in the rigid disks segment and is a major supplier to many OEMs. Verbatim Corp. focuses almost entirely on 5¼-in. floppy disks and has gained 25% to 30% of that market. Similarly, Nashua Corp. has gained approximately 17% of the rigid disk market and Wabash Tape Corp. and Graham

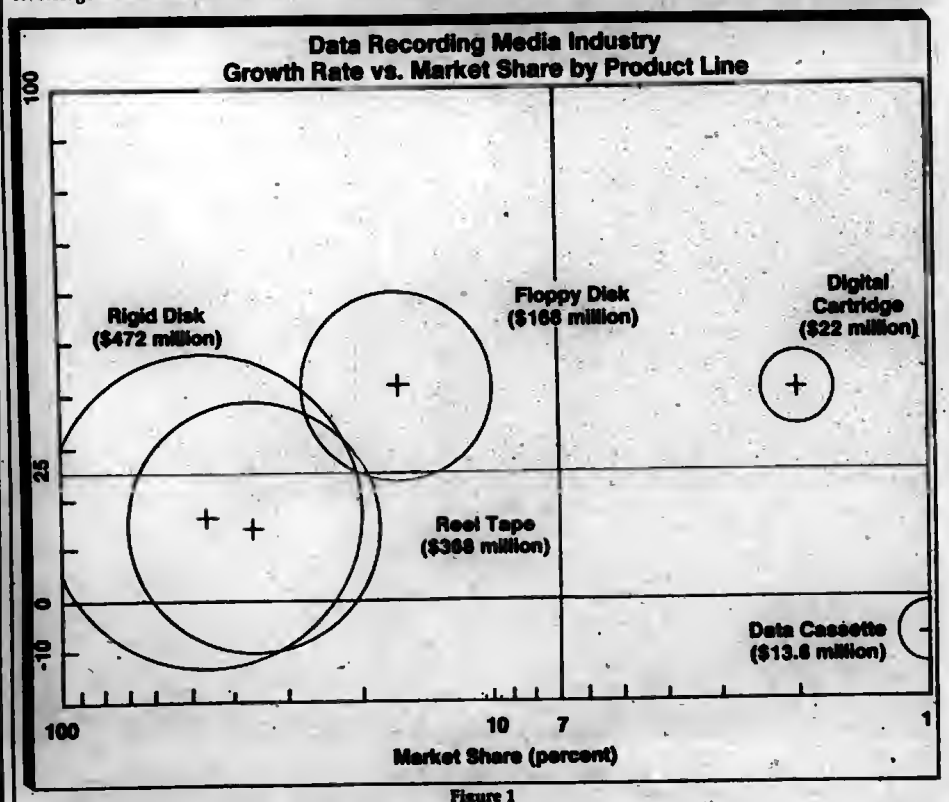

Figure 1

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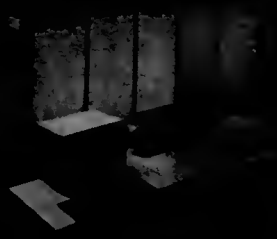

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IN DEPTH

Magnetics, Inc. each have captured approximately 13% of the ½-in. tape market.

Environmental Analysis

1. Economic Factors. The long-run prosperity of the magnetic media industry is a function of two factors: how the industry handles expansion of the data processing industry as a whole and how well the industry can compete with new and existing types of data storage technologies.

The data processing industry experienced exceptionally strong growth in 1980, despite the adverse economic conditions of high inflation and low economic productivity. The top 100 U.S.-based data processing companies grew 20.4% in 1980 to $55.6 billion in sales. Because of the inherent coupling between computers and storage devices, magnetic media sales follow computer sales directly.

The trends in sales as a function of computer capacity are of particular importance to the media industry since capacity tends to dictate media requirements. Sales over the past five years have shown mainframe systems losing their market share to mini and micro systems. The gain in mini and micro systems has fed the growth rate of products servicing these markets. However, mainframes still dominate the industry in terms of total dollar expenditures. Typical sales volumes for the general computer categories are shown in Table 1.

The trend is clearly toward the smaller, more compact computing systems. This trend is influencing the media industry with the emphasis on the smaller Winchester and floppy disks. Overall, the magnetic media industry is continuing to grow in all categories (except cassettes) as illustrated in Figure 1. However, future growth predictions strongly favor the smaller Winchester disks as well as the floppy disks and data cartridges.

Demand for ½-in. tape and the larger Winchester disks is also increasing. However, they are used primarily on mainframes and the larger minicomputer systems. Future growth predictions show a declining share of the total media market for ½-in. tape and large Winchester disks when compared with the smaller systems (see Figure 2).

Demanding Environment

The fast growth and advanced technology of the data processing industry translate into large research and development expenditures and large levels of capitalization. The magnetic media industry, to keep pace with the rest of the industry, faces these same requirements.

If capital funds are readily available, high-growth industries can easily prosper. However, in today's economy, capital funds are scarce and growing firms are forced to compete in the financial markets as fiercely as in the product markets. To sustain these high levels of R&D as well as capitalization, firms in the media industry must continually pursue financing through equity offerings or long-term debt. The high in-

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terest rates and cash flow problems associated with short-term debt preclude its use for these applications.

Strict adherence to a sound equity/long-term debt mix is essential for long-term profitability. This fact is particularly important for firms whose sole business is magnetic media. Larger firms such as IBM and 3M have very favorable equity-to-debt ratios (13% for IBM and 43% for 3M) relative to the industry average (67%). Hence, they are prime candidates for any new funds that become available. Consequently, smaller firms in the industry are forced into a high degree of specialization (product niche), or else they become obsolete and subsequently fail, or they are acquired by larger firms. In 1979, nine of the top 100 data processing firms were acquired or merged with strong entrants.

2. New and Existing Technologies. The magnetic media industry has responded to many challenges in the past and must continue to do so in light of a number of new technologies on the horizon. Among them are optical mass storage systems, semiconductor memories and magnetic bubble memories. Each of these poses a significant threat to the magnetic media industry. So far, the industry has been active in developing advanced products intended to neutralize the benefits of the alternate technologies. Following is a summary of the alternate technologies and some of the new magnetic systems:

• *Optical mass storage systems.* These systems, which use laser technology, have storage densities roughly 750 times greater than the typical rigid magnetic disk and 1,000 times greater than magnetic tape. The access times are comparable to those of rigid magnetic media; however, the optical systems have simultaneous access capability. Like magnetic media, they are nonvolatile, but cannot be erased or reused. There are major hardware and software problems yet to be resolved before such systems will be available to any large extent. Research in the field is continuing with major firms such as 3M, Storage Technology Corp. and Drexler Industries heavily involved.

• *Semiconductor memories.* Random-access memories (RAM) provide extremely fast access time, typically measured in nanoseconds (10^{-9} seconds). These are on the order of a million times faster than magnetic media. Although significant capacity gains have been made recently, semiconductor memory capacities are 100 to 1,000 times less than presently available magnetic media. In addition, semiconductor memories are volatile (require constant power) and are 100 times more expensive than magnetic systems. However, as capacity grows and costs drop, semiconductor memories can become a major threat to certain magnetic media.

• *Bubble memories.* Bubble memories are nonvolatile and have access times and storage densities comparable with rigid disk technologies. Their major advantage is that they are nonmechanical, so are not subject to any potential mechanical failures. However, they have not been standardized and have been plagued by development problems. Consequently, a number of firms have dropped out of the development process, including Rockwell International Corp., Texas Instruments, Inc. and National Semiconductor Corp. Intel Corp. (the leader), Westinghouse Electric Corp. and Motorola, Inc. are still pursuing the technology. More withdrawals and a collapse of the market are seen by some, but Intel estimates the bubble memory market to be $80 million this year and expects a doubling in 1982.

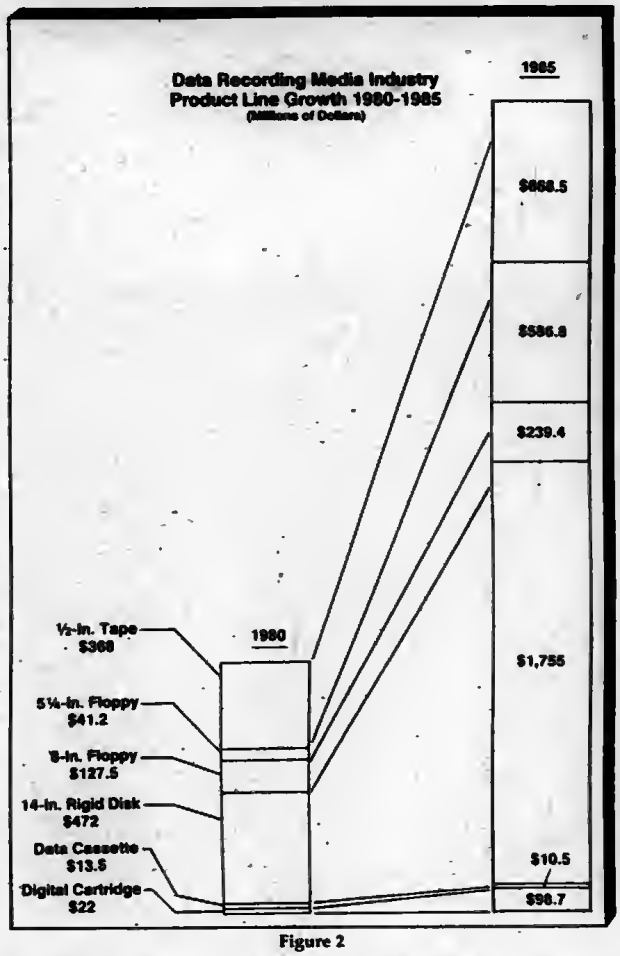


Figure 2

Advances in magnetic media include the following:

• *80M-byte tape cartridge.* Produced by Pragma Data Systems, Inc., this tape system is used as a backup for Winchester disk drives. In addition, it is used as a direct-access tape drive and claims storage capacities 100 times greater than floppy disks and access times 15 times faster.

• *160M-byte Winchester disk.* Century Data Systems, a Xerox company, offers a Winchester disk drive with a 160M-byte capacity at a storage density of 10,000 bit/in. and transfer rate of 1,280 bit/sec.

• *3.5-in. floppy disk.* The Sony Corp. of America offers a 3.5-in. disk with a capacity of 437.5K bytes. It claims twice the storage capacity of 5¼-in. floppies.

• *10M-byte removable cartridge.* The Iomega Corp. has developed a flexible-medium system that fits in the envelope of a standard 8-in. floppy disk drive, but is comparable in performance to Winchester products of the same capacity.

• *Double-density streaming tape drive.* Offered by Cipher Data Products, Inc., this device doubles the amount of data that can be stored on a standard reel of ½-in. magnetic tape. This characteristic translates into 92M bytes of data on a 10.5-in. reel, recorded at a transfer rate of 160K byte/sec.

3. Social/Political Influences. The greatest social impact on the magnetic media industry has been the acceptance and growing demand for personal computers. This acceptance has been fostered for the last decade by the introduction and growth of consumer electronics in terms of a broad spectrum of calculators and electronic games, both stand-alone and TV-oriented.

'The greatest social impact on the magnetic media industry has been the acceptance and growing demand for personal computers.'

Remarkable price reductions have allowed the consumer to enter the market. Consequently, various types of electronic equipment, including personal computers, have been integrated into the average home. The sale and maintenance of software for these computers are done entirely through magnetic media, primarily floppy disks.

A very closely aligned influence is the growing demand for small business computers, estimated at 22.2% compounded annual growth. In an effort to keep costs as low as possible and maintain reasonable margins in the face of double-digit inflation, many businesses are looking to mini- and microcomputers to increase productivity.

One of the largest potential problems for the magnetic media industry would be a severe disruption of the oil supply. A large percentage of media products and their packaging are made largely from oil-based plastic. Because many of the media are flexible, there are no readily available substitutes for many of the plastics being used. In addition, to maintain the necessary quality, the companies in the industry have established very high standards for the plastics they use, which would further aggravate the problem of finding adequate substitutes. Accordingly, a disruption in supply of these basic materials would limit the production capability and hence the profitability of the industry.

A second politically related concern for the media industry is the pros-

Computer Category	1980 Sales (Millions of Dollars)	1979 Sales (Millions of Dollars)	Percentage Growth
Mainframes	15,146	13,312	13.8
Minicomputers	8,840	6,916	27.8
Microcomputers	769	418	84.9
Word Processors	881	538	63.8

Table 1

IN DEPTH

pect of strong Japanese competition. Depending on the level of direct Japanese governmental support of the industry, Japanese vendors could establish prices below U.S. levels and gain a significant share in the more price-sensitive markets.

Whether the U.S. government would intervene with duties, tariffs or some other restriction is unknown. Many other industries have suffered because of strong Japanese involvement in electronics and related fields. The Japanese are active in the magnetic media area and will dominate the Far Eastern markets in the near future. They can be expected to focus on the U.S. markets as their capacity grows.

Industry Dynamics

1. **Critical Success Factors.** The overriding success factor in the magnetic recording media industry is product quality. The medium is the most critical component in any storage device because it is the physical element that actually stores the information. Any flaw in the medium can cause the stored information to become irrecoverable, hence negating all the efforts required to create it. As a result, the user can incur a very significant expense and in some cases lose information forever.

Furthermore, if a company has quality problems, the customer will soon discover them. The company with a poor reputation will find it extremely difficult to overcome. Many companies have experienced this problem and are well aware of the consequences. The concept of quality has accordingly become a major point in the competition among firms.

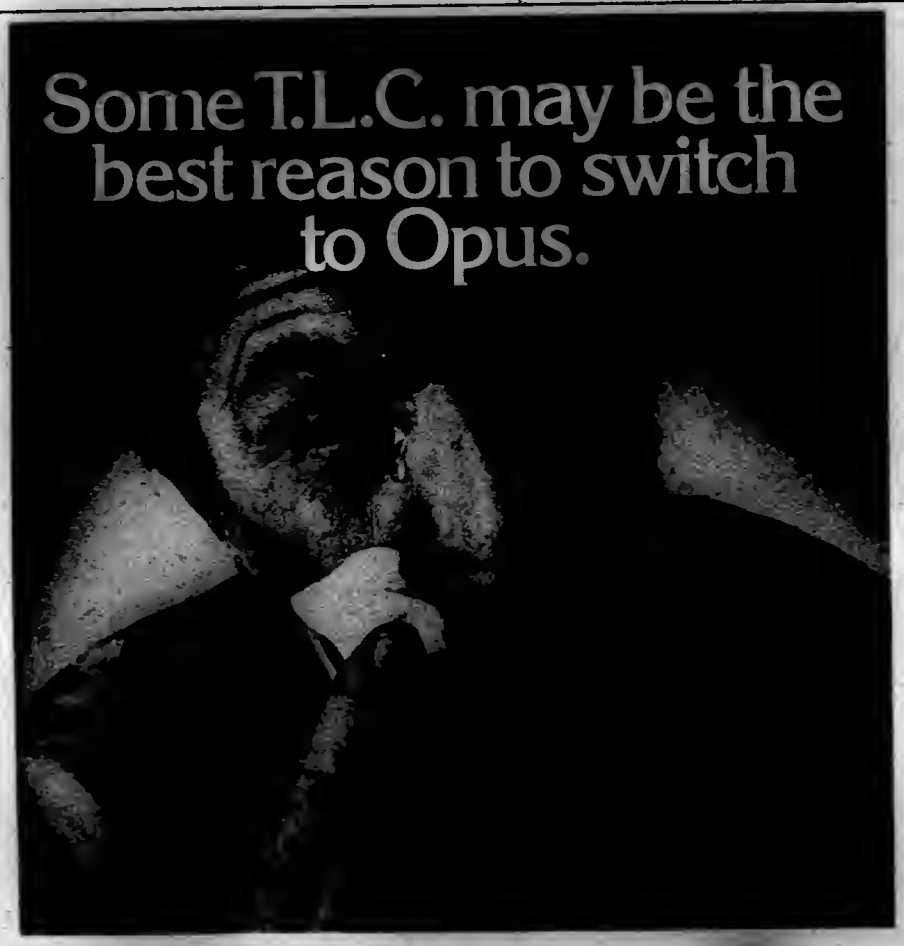
The relationship between quality and price in the magnetic media industry is rather unusual. Although annual sales are $1 billion, this sum represents only 2% of the total annual expenditure for hardware, software and services in the entire electronic data processing industry. Because of the critical nature of magnetic media and the very low relative cost, the industry always chooses quality over price. Accordingly, price is relatively unimportant to both equipment suppliers and end users. Media manufacturers spare no expense to ensure a high-quality product.

The quality of the product is dependent on a number of elements including raw materials, the manufacturing process, magnetic coatings, development of the surface finish and the amount of testing prior to shipment.

Of these various elements, the process of applying the magnetic coating to the carrier material is by far the most important. Since it is a process rather than a procedure or precision operation, it is much more difficult to control and repeat precisely each time. Consequently, the percentage of successes, or yield, can vary significantly. Since the yield cannot be predicted accurately, the manufacturing cost can vary, directly affecting a vendor's profitability.

The long-term aspect of quality is the product's reliability over time. This aspect was identified in our study as another critical success factor. The customer must be convinced that the product will have a reasonable life and will tolerate normal handling procedures. Extensive test programs and close contact with the customer to gain feedback on the product's performance are essential in achieving high reliability.

A third and also unanimously identified critical success factor is maintaining technical expertise. The in-



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dustry is characterized by rapid technological change. The task of staying at the leading edge of technology and ensuring that one's products are on a par with the industry requires significant R&D expenditures and the acquisition and retention of highly trained and experienced personnel.

Even more R&D and uniquely qualified personnel are necessary in order to lead the industry by developing advanced technology products. These requirements become very difficult to meet because of the huge financial demands and the lack of trained personnel.

2. Emerging Threats and Opportunities. The predominant threat within the industry is technical obsolescence. For example, the introduction of the Winchester or fixed-type disk has significantly reduced the demand for removable media. Other significant threats, discussed earlier, include the development and application of alternate memory systems and potential problems associated with the oil supply and with Japanese competition.

A threat faced primarily by the smaller firms in the industry is backward integration by the disk drive manufacturers. Since the OEMs typically represent 40% to 80% of each firm's business, a major move by the OEMs to vertically integrate media production could significantly reduce the size of the potential market.

Many of the opportunities in the magnetic media industry revolve around continued growth in the computer industry. Inherent in any computer installation, ranging from the basic home computer to large mainframes, is the need for more storage capacity. Magnetic media now represent the only reliable and cost-effective means of satisfying this need. In a rapidly growing industry, many firms can survive and grow along with the industry in general. This situation presents valuable opportunities for firms that have the discipline to enter and leave the industry at appropriate times.

Personal and small business computers along with word processors and small terminals represent significant new market segments primarily for the floppy and small Winchester-type disks. These markets are estimated to be growing at a rate of 23.3% annually. These markets will represent 27% of the total media market in 1985 as compared with 7.2% in 1980 (see Figure 2).

Rising Technologies

Two other emerging technologies that can represent either a threat or an opportunity, depending on the level of one's involvement, are thin film media coatings and vertical recording techniques. With the thin film process, the medium's surface is coated with thin metallic film rather than with the typical iron oxide coatings. The objective is to develop a process that is more predictable than the present processes and one that will yield a higher quality recording surface.

Vertical recording involves magnetizing the medium in a plane perpendicular to the surface rather than parallel to it. This process will allow recording densities to be increased by a factor of four to 10 over today's technology. This technology is directed toward increasing the capacity of small floppy disks and the fixed Winchester variety. Both technologies can potentially change the present manufacturing techniques and processes and cause substantial changes in the industry.

3. Market Position and Competitor Analysis. Customer needs in the data recording business have been fairly consistent over time, but also rather broad. In general, the customer wants high storage capacity per unit, faster access times to retrieve an arbitrary piece of information, greater reliability, more compact dimensions and lower prices per megabyte. The magnetic media play an important role in most of these areas, except perhaps for access time and price.

The storage capacity is uniquely tied to the density and uniformity of the medium's magnetic coating. With increased capacity, the same amount of information can be stored on a smaller element, thus reducing the physical size of the overall device. As mentioned earlier, reliability

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is heavily dependent upon the characteristics of the medium. All of these requirements are interrelated, making it impossible to focus on only one.

The evolution of various storage devices has resulted in remarkable gains in all of these areas and has provided the customer a broad spectrum of products and capabilities. Significant R&D efforts are continuing in all these areas. As indicated earlier, R&D is considered one of the critical success factors in this industry.

Field of Contenders

Because of the data processing industry's growth rate, the demand for many media products exceeds supply. This phenomenon has led to a rather large number of major competitors. Except for the very large firms, most have chosen to compete in a selected segment and to ignore the rest of the market.

A large percentage (40% to 80%) of the sales of suppliers in the media industry is to OEMs, where competition is based almost solely on the product's performance and quality. In fact, many OEMs work closely with the smaller independent firms to generate a product that meets all their requirements. Many of the vendors have indicated that their strategies include a greater emphasis on the OEM segment and a move toward more OEM sales, the primary reason being the lower cost of sales associated with OEMs relative to end users.

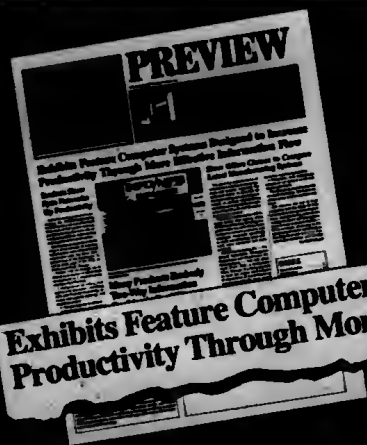
Two other areas that play an important role in the competition among firms are brand identity and strong customer service. Both of these areas are related to product quality and reinforce the customer purchase decision.

Coming Up

A number of trends will continue to make magnetic media a vital industry in the near future:

- Movement toward the "office of the future," with fewer paper transactions and more computer media transactions taking place.
- Rapid penetration of the home and business markets with word processors and microcomputers.
- Advances in technology that will keep the costs per megabyte of magnetic media low and limit the entry of alternate data storage technologies in the market.

Our study points out that there will be an estimated 25% annual compound growth in this market through 1985. By all indications, magnetic media will continue as a growth industry for the 1980s.



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STAGES OF CONCERN

Coping With Change in Office Technology Implementation

By Dave Ackley
And Pat Ackley

MANAGER: "I'M REALLY concerned about the time it's taking for my people to prepare all the information you need. Is this big productivity planning project really worth it?"

Senior Systems Analyst: "Am I supposed to give up all my years of experience and training just to implement this new office communications architecture gimmick?"

Project Leader: "My own project could benefit from your new office automation approach, but we'll have to work together to keep from wasting time covering the same ground."

What do these people have in common? Are these just different ways of reacting to a new idea, or are there important messages behind the statements? They are all concerned with a new way of doing things, but should each person be treated in the same way?

Each of these examples expresses a concern about change, but from a different perspective. The manager wants to know how he is going to manage the new situation. The senior systems analyst is worried about how the changes will affect his job status. The project leader wants to collaborate. What they all have in common is concern about the innovation; where they differ is in their stage of concern.

Planning and implementing a new technology, such as office automation, require a significant change from the old

IN DEPTH

way of doing business, not only for office workers, but for their managers and the systems analysts and project leaders who design the new systems. Office workers are faced with new tools and job instructions, systems analysts with new methods.

Corporate changes of this magnitude involve an adjustment in the attitude of many individuals throughout the company. The adjustment is an education and acceptance process, rather than an event or decision point. These changes entail a developmental growth in the individual's feelings and concerns about the new concepts and the skill he will use in applying the new methods.

Success in implementing new technology depends not only on knowledge of the technical subject, but also on understanding how the changes affect personnel and how to deal effectively with their concerns. Identifying and understanding "stages of concern" is one technique for coping with the personal issues that arise during the innovation process.

Individual Attitudes

The concept of "concerns" relates to the feelings, perceptions, motivations and attitudes of individuals as they first become aware of an innovation, approach and use it and gradually gain confidence in applying the new techniques. The earliest of these concerns are *self* concerns, where the individual focuses on his own adequacy in dealing with the change. As these initial concerns are resolved, *task* concerns are aroused over the "how to do it" aspects of the change. Eventually, the focus shifts to the innovation's *impact*.

Implementation of office automation methods (or data base or distributed processing) involves significant changes. Most planners of innovations of this kind intuitively incorporate steps into their implementstion plan to lead the participants through such stages. However, the plan is usually aimed at the aggregate, not at the individual participants; such plans often fail to account for the wide range of differences in individual attitudes and concerns.

A problem arises when the implementation project has proceeded past the initial education phase and on to actual implementation tasks, while certain key participants have not yet understood and accepted the basic concepts of the innovation. Such individuals are still at the lower stages of concern, while the focus of the project has already moved on to the higher task-oriented stages. The following discussion describes a method for early detection and resolution of such synchronization problems.

The framework of "stages of concern" was developed by Gene E. Hall and Susan Loucks at the University of Texas at Austin. Several assumptions underline their method for effective implementation of change:

1. Change is viewed as a *process*, not an event. Heavy emphasis is placed on the fact that an innovation process takes time to unfold and is not accomplished by fiat of a key decision maker.

2. Change is accomplished by *individuals*. If attention is not given to this personal dimension of the process, it is not likely that the company will be able to initiate, maintain or institutionalize the change.

3. Change entails *developmental growth* in terms of the individual's feelings about the innovation and skill in using the new technology. An individual is not one day completely naive in relation to use of a new method and the next day an instantaneous expert and highly sophisticated user.

4. There must be a *leader*, formal or informal, within or outside the company who plays an active role in facilitating adoption of the innovation. Whatever the official role, he must have particular skills in order to be effective in making appropriate interventions as the change process unfolds.

Seven Levels

Seven stages of concern have been identified by Hall and Loucks for individuals involved in implementing a major change such as office automation. Although every individual may not dwell on each of the stages, the existence of all seven has been verified through extensive research. The first three stages involve self concerns; the fourth, a task concern; and the last three, impact concerns.

- **Stage 0, Awareness:** The individual shows little concern about or involvement with the innovation.
- **Stage 1, Informational:** The person becomes generally aware of the innovation and interested in learning more detail about it. He seems to be unconcerned about himself in relation to the innovation. He is interested in substantive aspects such as general characteristics, effects and requirements for use.
- **Stage 2, Personal:** The individual is uncertain about the demands of the innovation, especially regarding his adequacy to meet those demands. There may be a great deal of ambiguity about the role to be played, internal conflict and a feeling of not being fully in control of the situation.
- **Stage 3, Management:** Attention is focused on the processes and tasks of using the innovation and the best use of information and resources. Issues relating to efficiency, organizing, managing, scheduling and time demands are utmost.
- **Stage 4, Consequence:** The individual is thinking about the impact of the innovation in his immediate sphere of influence. The concern is about performance, competencies and outcomes.
- **Stage 5, Collaboration:** The focus is on coordination and cooperation with others in using the innovation.
- **Stage 6, Refocusing:** The focus shifts to the broader benefits that will result from the innovation and to the possibility of further changes or replacement of the innovation with a more powerful alternative. The individual usually has definite ideas about improvements to the existing form of the innovation.

An individual will often have concerns at more than

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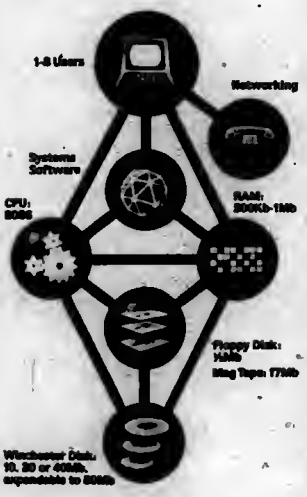

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★★EXTRA★★

IS-2048: Full-featured, commercial-quality color graphics terminal

The Right Product, At the Right Time
The Demand of Current Economic Conditions

The IS-2048 couldn't have come at a better time. Both hardware and software systems houses need new and enhanced products to attract new customers and to increase sales to their existing customer base.

Now, thanks to the highly competitive price of the IS-2048, these manufacturers can immediately offer their customers the advantages of color graphics, and at a price comparable to a good black and white terminal.

"Our customers' products sell more quickly and with better margins when they feature color graphic displays," explains Paul R. McGraw, Director of OEM Sales for Intelligent Systems. "Test marketing has established a high appeal of color graphics among end users."

Color Will Capture 85% of Graphics Terminal Market by 1985

Venture Development projects a boom in the graphics terminal market, reaching unit sales of 250,000 in 1985, compared to 30,000 produced in 1981. And 85% of those 250,000 graphics terminals are forecast to be in color! The IS-2048 offers OEMs the advantage of entering this rapidly expanding color graphics market ahead of their competition.

Recent communications studies indicate that managers receive 40% of their information through reports consisting of statistical data accompanied by a written analysis. When these reports are translated into color graphics displays, comparisons between numbers become instantly obvious. Exceptions are readily identified. Data relationships are easily conceptualized and remembered. As a result, management can rely on color to highlight key information and illustrate meaningful trends.

Thus, the quick, clear communication power of color graphics generates faster decision-making, greater accuracy and increased management productivity.

Attractive Pricing and Early 1982 Availability

Intelligent Systems has positioned the IS-2048 for sales to high volume OEMs and large end users. The $995 price is for quantities of 600 or more, with single-quantity evaluation units available to anyone at $995, cash with order.

Delivery of the IS-2048 started in January. Mr. McGraw noted, "We will allocate units to quantity purchasers as we receive them and guarantee 45-day delivery after receipt of the order. We have been given firm commitments from our component vendors, which permits us to deliver adequate quantities to buyers who make a prompt decision."

Color Graphics Terminal — $995
An Industry First, IS-2048 Breaks $1000 Price Barrier

Intelligent Systems announces the IS-2048, a full-featured color graphics terminal for $995 in quantities. The IS-2048 is an ASCII, all-purpose, intelligent color graphics terminal designed for high-volume end users and OEMs. The $995 price is for the complete, self-contained unit and includes the 13" color CRT, CPU, 72-key ASCII keyboard, graphics package and graphics software, including firmware for vectors, bar graphs and point plots. Additional features include:

- 8 foreground colors with blink and 8 background colors
- Refresh rate of 60 frames a second, delivering excellent color saturation, brightness and resolution
- CRT display capacity of 2048 characters
- RS-232C communications port
- Special graphics characters which provide enhanced resolution
- Selectable baud rates from 110 through 9600
- Editing commands for tab, erase line, erase page, blink, color selection, cursor positioning, transmit

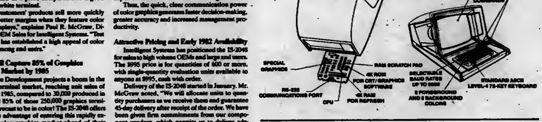
Intelligent Systems' IS-2048 is manufactured for commercial/industrial applications and is a full-featured, business-quality color graphics terminal. The IS-2048's memory consists of a RAM scratchpad, 4K RAM for refresh and 4K ROM for CRT and graphics.

IS-2048 Is Designed for High-Volume End Users and OEMs

"The secret of success in selling to the high-volume market is fairly simple," states Peter J. Curnin, company president, regarding the announcement of the IS-2048. "You have to deliver the right product with the most sought-after features, sooner and for less money than the competition." With the IS-2048, Intelligent Systems has done exactly that.

Intelligent Systems, founded in 1973, pioneered the color graphics business. The company manufactures a complete line of color graphics display terminals, desktop computers and stand-alone graphics systems. These products are used in a variety of applications, including presentation graphics, MIS, scientific/engineering and numerous control applications.

Noted for its high volume and the industry's best price/performance ratios, Intelligent Systems was the first company to manufacture and ship over 20,000 color graphics units. Several years ago the company crossed the $2,000 price barrier, more recently introduced a color graphics terminal for under $1,500, and now the company has smashed through the $1,000 color barrier — again ahead of other color manufacturers.



Not The Far East. . .Color Price Breakthrough Came From Georgia

While everyone was watching Tokyo and Hong Kong, anticipating the next price/performance breakthrough in color graphics, an historic price announcement was quietly prepared in Norcross, Georgia, in the rolling hills some 30 miles north of Atlanta.

Since introducing the first color terminal using a microprocessor in 1975, Intelligent Systems has been surprising the industry with one "first" after another. Soon came the first CP/M based color microcomputer, then the first color-enhanced word processing system, and the first dot addressable color terminal priced under $3,500.

Price/Performance Factors Design of Single-Board Terminal

Now the company reveals how it was able to produce the first full-featured color graphics terminal for less than $1,000.

Intelligent Systems' IS-2048 is the end result of a full year of product refinement, involving 30 prototypes tested at customer sites. A significant concept that permitted performance excellence at such a remarkable price was the design of a "single-board" terminal. This design/concept eliminated expensive card cages and complex circuitry.

Productivity, High Volume Contribute to Record-Low Price

In 1981, at a time when business analysts were worried about the nation's level of output, Intelligent Systems set impressive records for high productivity per employee. According to the 1981 Operating Ratios Summary of the American Electronics Association, the company more than doubled the national average for the industry!

Based on Intelligent Systems' track record of high unit sales and corresponding volume production and purchasing, firm commitments from component vendors made possible a 1982 reduction in component costs, some by as much as 40%. These cost reductions were a major factor in the record-breaking price of $995 for the IS-2048.

Cost-conscious design and development, high productivity and volume purchasing combine to explain Intelligent Systems' continuing price breakthroughs. And that explains why more and more observers, who formerly looked to Tokyo or Taiwan for pacesetting production and pricing, now are turning their attention to the red clay hills of Georgia, to a company accustomed to making color graphics breakthroughs—Intelligent Systems Corp.

Experienced Graphics Team Converts Software to Color
Intelligent Systems Offers Color Conversion Training Seminars

Seminars providing intensive training in color graphics are now available to customers and potential users. For a $350 fee, buyers can send up to four employees to Intelligent Systems' headquarters where instructors, software engineers and product designers provide expert help in the conversion to color.

Implementation of the IS-2048 consists of connecting to a host computer and modifying existing applications software to produce color graphics displays. The seminar and documentation provide all of the instructions and codes required for communicating with the IS-2048. Where needed, an ANSI Terminal Firmware Program is offered as an option for only $100.

Conversion of Software Is Simple; Creating Graphs Takes a Bit Longer

The addition of a few simple codes will generally bring up bright, colorful displays. Adding graphics and designing effective screens is a bit more time consuming, but Intelligent Systems' experienced instruction team simplified that process.

"We are confident that our training will provide all the necessary information and documentation for successful use of the IS-2048," Director of OEM Sales Paul R. McGraw states. "We have some of the most experienced color graphics instructors and implementors in the business at our factory headquarters. At the end of a one-day work session we guarantee that our potential users will see their most useful screen display translated in color graphics. If we don't succeed, we'll refund the $350 workshop fee."

Mr. McGraw envisions some of the strongest demand for the product coming from the MIS sector, declaring, "Firms serving the MIS area, as well as MIS managers, are feeling real pressure to convert to color. We offer them a way to do it quickly, inexpensively and with solid, experienced support. Financial reporting, trend analysis—it's all faster and much more informative for users when it's conveyed in color graphs."

For further details on Intelligent Systems' Conversion-to-Color-Seminars, contact Paul McGraw at company headquarters.

Intelligent Systems™
AFFORDABLE COLOR GRAPHICS

STAGES OF CONCERN

IN DEPTH

one stage at the same time. Each particular person will have a "concerns profile" at any given point in time, with some stages relatively more intense than others. For example, during the early phases of planning and implementing a major change, stages 0, 1 and 2 "self" concerns will usually be the most intense. As implementation proceeds, stage 3 "management" concerns become more important, with stages 0, 1 and 2 decreasing in intensity. In time, the "impact" concerns of stages 4, 5 and 6 will become the most important.

'It is best not to ask the user directly what concerns he has, but to ask him to talk about what he is doing with the innovation and how it is proceeding. This provides an opening for the person to interject feelings and concerns about the situation.'

Ground Rules for Managers

Throughout the planning and implementation of a major change, individual users and participants will exhibit a wide range of concerns and will seldom all be at the same stage of concern at the same time. The implementors and managers of such an innovation will find the following ground rules helpful in maintaining an awareness of the individual participant's views:

- Be sure to attend to the user's concerns, as well as the technology.
- It is OK for the user to have personal or "self" concerns.
- Do not expect change to be accomplished overnight.
- Users' concerns may not be the same as those of the planning team.
- Within any group of users, there will be a variety of concerns.

The easiest way to determine an individual's stage of concern is to talk about it. Ask leading questions, listen for clues in informal discussions and evaluate his requests for information or support. Experience has shown that it is best not to ask the user directly what concerns he has, but to ask him to talk about what he is doing with the innovation and how it is proceeding. This provides an opening for the person to interject feelings and concerns about the situation.

Another approach is to ask for the person's opinion about the innovation's strengths and weaknesses and what kinds of problems have arisen. This type of question-and-answer technique is a "seat-of-the-pants," intuitive approach that improves with practice.

The following examples illustrate the types of statements that can be expected from users and participants, either in response to questions or embedded in correspondence: Each example shows the statement or question, together with an assessment of the stage of concern upon which the individual is primarily focused:

"Why no, I haven't heard much at all about the Office Technology Project." (0 — Awareness)

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CW-3

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"That sounds great, but don't these rental schemes lock you in for 5 years?"

"No, not if you rent from HAMILTON. If you know you're never going to change so much as a terminal for 3-5 years, then go talk to your bank about a long term lease. But, if you want the flexibility of upgrading either all or any part of your system when you need to, then go talk to HAMILTON about rental. They'll listen."

"That's really interesting. I didn't know I had that kind of rental alternative."

"And what's more, you can talk to HAMILTON about their rental-with-purchase-option plan which gives you the right to buy the system when you're ready."

"But will DEC maintain my HAMILTON rental systems?"

"DEC maintenance is already INCLUDED in your monthly rentals. Plus, HAMILTON handles all the shipping and guarantees you a really smooth installation."

"HAMILTON certainly has a comprehensive rental program."

"Of course. They have more experience in renting DEC systems than anyone else, with thousands of installations in Europe and North America."

"You know, if they hadn't limited my department budget this year, I could have gone straight to a VAX 11/750. Hey. I don't suppose HAMILTON rents....."

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IN DEPTH

"I've been reading about this office of the future idea, but I really don't understand what it means. Can somebody please give me a good explanation in plain English?" (1 — Informational)

"I've been designing successful systems around here for more years than you've been out of school. Now you come along with this new office architecture method that's supposed to make everything I ever learned obsolete. And you want my support for your project?" (2 — Personal)

"The people in my organization simply can't afford to spend all the time it takes to help you prepare these data flow diagrams. These interview sessions and reviews are killing us!" (3 — Management)

"It's going to take a lot of work, but I can see how developing company-oriented data bases will help all of us get the information we need. I've even prepared a little analysis on how it might improve the effectiveness of my operation." (4 — Consequence)

"My own productivity improvement project could really benefit from your new distributed processing approach, but we need to work together. Your people are covering many of the same areas my team has already investigated." (5 — Collaboration)

"I've been meaning to talk to you about the project. It's coming along great, but I think I know of a way to set up the communications network to perform even better." (6 — Refocusing)

By paying attention to the kinds of statements being made, the implementation team will be able to identify the individual's present stage of concern. This is a valuable tool, both as an aid to effective communication (it does little good to present information at the task or management level if the individual is still greatly concerned about personal issues) and for identifying needed action (if it is time to begin the tasks, that same individual will need quick remedial attention).

When remedial action is required, the intervention must be appropriate for the stage of concern involved. The following examples illustrate the types of intervention technique that may be suitable for each of the seven stages of concern:

0 — Awareness: It is usually best to have an influential person, either from within the company or from outside, give the initial presentations. Use short presentations that bring out the key features, advantages and highlights, accompanied with handouts that provide a brief overview of the project.

The person responsible for planning and implementing a major change will need to work in a highly adaptive way. He should constantly assess the stages of concern of the individual participants and users, monitor their progress and adapt intervention methods as required.

1 — Informational: Use longer workshop sessions or seminars that provide more detail on the general concepts, the effects of the changes and the manner in which users will participate in the implementation process.

2 — Personal: This stage involves more individual contact and should not be rushed. Provide opportunities to individuals for expressing their feelings on the innovation. Provide strong reassurance for both technical and personal support throughout the implementation duration. Failure to allow time and accessibility at this stage may result in sabotage later on.

3 — Management: Bring in all the guns here. Provide tangible evidence of top management commitment to both the project objectives and to providing the tools and funds to get the job done. Offer suggestions and alternatives for managing the transition to the new methods. Make sure the participants are aware of the education, training and administrative assistance being provided.

4 — Consequence: Continually solicit feedback from users. Offer examples of changes' effects on other comparable areas of the company and the positive results achieved.

5 — Collaboration: Provide a forum for reviewing opportunities for coordination and cooperation among the various organizations and tasks involved. Arrange periodic exchange meetings among the different teams.

6 — Refocusing: At the early stages of the implementation effort, acknowledge the new ideas, but encourage individuals to keep their attention on the tasks at hand. When the implementation is nearing completion, establish a formal mechanism for discussing new ideas and proposed changes to the approach.

To use these techniques effectively, the person responsible for planning and implementing a major change will need to work with the users in a highly adaptive way. He should constantly assess the stages of concern of the individual participants and users, monitor their progress and adapt intervention methods as required. Used in this manner, the stages-of-concern technique will provide an early warning of potential user problems and a valuable tool for correcting communication and educational deficiencies that often occur during the process of implementing change.

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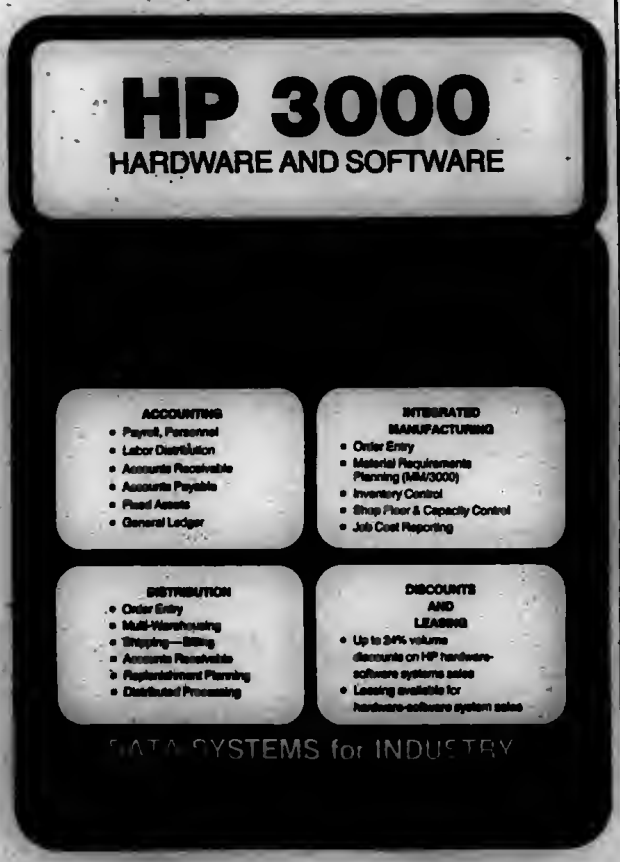

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He has 20 years' experience in the computer field with a current emphasis on data resource management and office automation. He holds a B.S. in electrical engineering from Stanford University. His B.A. and MBA were completed at California Western University, where he focused on data base long-range planning and financial management.

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She has eight years of experience in data processing and 11 years in the field of education.

She holds an M.S. in industrial psychology from San Jose University and is a doctoral candidate at the University of Southern California.

SPECIAL REPORT

Distributed Data Processing: Putting the Pieces Together

Edited by Tim Scannell & Tom Henkel

February 22, 1982

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

An Attractive Alternative

The DDP Solution: Localizing Control of Data

By Curt Whall
Special to CW‡

Products and solutions for localizing data processing functions are presenting many attractive alternatives to today's DP user community. No longer is the large, generalized, central computing facility the only rational choice for providing data processing services. Distributed data processing (DDP) is a reality.

The goals of DDP are to allow an organization to improve responsiveness to users, improve manageability of its data and data flow and optimize the cost-effectiveness of its DP operations.

The DDP solution attempts to achieve these goals by localizing the control, processing and storage of data at the sites most directly concerned with it.

In other words, it should provide each unit with precisely the capacity and control it needs, cutting out the middleman costs and compromises represented by the central DP site. At first glance this seems to be such an obviously good idea that it's a wonder why everyone isn't rushing to DDP operations.

But it is difficult to achieve distribution while avoiding dismantling and fragmenting an organization's entire DP structure. After all, the data and DP functions within an organization do have some relationship to one another. Some degree of integration of the data and the activities and groups that produce it is necessary.

Processors suitable for DDP are available in a wide range of sizes and shapes. While this variety of choice gives great freedom in selecting the right system for the job, it makes the integration problem nightmarish.

This is further complicated by the proliferation of communications methods to link the various hosts. All have recommendations and drawbacks. None are desirable or even possible to implement as the single network standard.

How can one then integrate maxis, midis, minis, micros and word processors with Systems Network Architecture/Synchronous Data Link Control, X.25, broadband, baseband, long-haul net, local net and so on?

Many organizations are adopting a wait-and-see attitude — waiting for some standard or group of standards to emerge that will allow smooth, coordinated, distribution away from centralized facilities and toward user sites.

Pressure is mounting among users, though, for control of their own data. More data is moving out toward local control every day. This will continue regardless of whether it is done in a comprehensive, coordinated way or in a fashion more resembling the Oklahoma land rush.

'Pressure is mounting among users . . . for control of their own data. More data is moving out toward local control every day. This will continue regardless of whether it is done in a comprehensive, coordinated way or in a fashion more resembling the Oklahoma land rush.'

As one DP executive recently put it, "We're going to have to let them go, but we're afraid they're going to get into trouble." Fortunately, there is a way to achieve such integration today using current products and technology.

Considering the present diversity in hardware, software and communications methods, integration is only possible using compatibility at the lowest common demoninator, that of the data itself.

The way that this is achieved is through the use of a single distributed data base management system (DDBMS) operating in a loosely coupled network defined by the software operating at each node, where each node can operate independently.

The hardware and telecommunications software at each node need only recognize a point-to-point connection between itself and another host. That this link is an arc in a network is a fact known only to the DDBMS involved. Thus, the network is a logical construction, independent of hardware types, communications protocols or telecommunications software to define its existence.

The DDBMS at each node has three responsibilities: managing its own local data base, processing requests directed to it and managing the routing of requests to other nodes. Traffic between nodes is in the DBMS own format, suitably sandwiched within whatever protocol requirements a communications link demands.

At each node the DDBMS is configured to satisfy its local processing requirements and to operate within the capacity of its host processor. It will also be equipped with the logical ports that allow it to communicate upon the loosely coupled net.

Finally, each node will have the computer and human resources necessary to support and reinforce any extraordinary requirements of the outlying sites that feed into it. These will include sufficient processor and storage capacities, DBMS functionality, common applications and data bases, common peripheral services and appropriate technical and support personnel.

Capabilities at the various nodes will vary widely. At the largest facilities, full DBMS functionality will be offered, including host language applications processing, query language processing and free text processing. They will be able to support concurrent transaction volumes from multiple sources. At each level of diminished capacity, fewer and fewer concurrent activities will be supported and capabilities will begin to disappear.

At the low end of the scale, microcomputers and word processors will not be able to host a DDBMS. They will be equipped with DDBMS vendor-supplied interface modules that will allow two new modes of operation. First, the interface may be accessed by a local application to access remote data.

This remote data can either be used as is or related to local data in local files. Second, the interface may be used in a stand-alone mode to operate as an intelligent terminal. In both modes shared communicatons links will be used to transmit the network traffic. Intermediate DDBMS, along the way to the desired destinations, will do little more than act as message-switching and protocol conversion modules.

Three Criteria

In order to be successful, any system must be measured by three criteria: technical feasibility, manageability and cost-effectiveness.

In the first case, the technology has been around for some time and has been proven. In the second case, it requires very little overall management. Since each node must be able to operate independently, linkability between nodes becomes more a matter of convenience than of necessity. Thus, no comprehensive management structure is required to keep the network units functioning.

In actual practice, network management is primarily a case of establishing and maintaining pair-wise communications and service agreements between node managers. It is desirable, however, that there be some kind of coordinating body among the network members.

The function of this body is primarily to establish network conventions. Even in a loosely coupled network there must be uniformity among such items as public data base names, node names and maximum message sizes.

If the net is to operate smoothly, as such, this group would act more as a convention of shared users than a managerial body. Note, however, that standards set by this group would not preclude the existence of private networks using private conventions, even if these private nets were totally or partially embedded within the larger physical structure.

Whether the system is cost-effective has not yet been fully answered and will not be until production DDP environments are implemented and used. Its characteristics, however, indicate that it will be.

Whall is a senior product development specialist with Infodata Systems, Inc.

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Multifunction Systems Seen Hot Item by Mid-Decade

By Tom Henkel
CW Staff

FRAMINGHAM, Mass. — Multifunction systems that employ multiple desktop processors but do not include a host processor will be hot distributed data processing (DDP) items by 1985.

That, at least, is the opinion of International Data Corp. (IDC), a market research firm here. Although multifunction systems now represent a small part of the DDP marketplace, IDC noted that the market is growing at an average annual compound rate of 100% per year, and the value of multifunction systems is increasing 64% per year. The firm added that stand-alone desktop processors are also getting more popular and will be big sellers over the next three years.

In its report, "Distributed Data Processing and Multifunction Systems," IDC said that word processors like IBM's Displaywriter and desktop processors like Xerox Corp.'s 820 are forerunners of multifunction systems.

IDC defines a multifunction system as one that offers DP capabilities (including a high-level language such as Basic and a processing-oriented operating system like CP/M), word processing capabilities and communications with some other device, such as a minicomputer, a small business processor or other desktop units.

In terms of more traditional product groupings, IDC projects that desktop processors will experience the most dramatic growth over the next three years.

In 1982 the desktop market is expected to grow by 327%. In 1983 it will grow by 192%, 95% in 1984 and 55% in 1985, the report noted.

Small business systems came in a distant second, in terms of growth, with 33%, 30%, 28% and 25% increases expected from 1982 to 1985, IDC said.

'Stellar Year' — 1983

Considering all types of DDP gear (mainframes, minicomputers, desktop processors, processing terminals and small business systems), 1983 will be a stellar year for purchases, IDC said. According to the research firm the market will grow by 82% next year.

In addition to being hot sellers, desktop processors will change dramatically over the next few years. "These systems were primarily intended for stand-alone use, but the possibility for some connectivity is now present. Early systems had very little communications capability and were not easily interfaced with other systems. However, this scenario is changing rapidly," IDC said.

IDC contends that the most important desktop development so far has been the joint announcement by Tandy Corp. and Datapoint Corp. that the Radio Shack TRS-80 is now compatible with the Datapoint ARC system.

For DDP Applications

With more and more companies investing in small business and desktop processors, IDC said that the real market penetration will come in the next two years. Firms like Tandy Corp., with its TRS-80 processors and the newly announced TRS-80 Model 16; Xerox, with its 820 and Ethernet; IBM's Personal Computer; and Digital Equipment Corp.'s processor module for the VT-100 terminal will all be used for DDP applications.

IDC added that while virtually all capabilities and interfaces for DDP applications will be available during 1982, there may be a slight sag in the desktop DDP market until users can sort out all the details of the recent announcements.

A less explosive segment of the DDP industry is processing terminals. IDC pointed out that this market falls into two categories: stand-alone and clustered units.

In the DDP market only the clustered category is significant. IDC defines the terminal system as one with a shared central storage and printers, and in some cases a shared central processor is used for a limited number of terminals.

Many of the clustered terminal systems are multifunction by design with limited multifunctional capabilities. IDC noted that clustered processing terminal systems used in DDP applications represent the higher end of most manufacturers' product lines. They tend to require high-level languages and file management capabilities that require higher-end hardware.

In the present DDP market, processing terminals make up the largest portion of any hardware submarket. IDC said that its projected changes in the desktop and minicomputer markets will have an impact on processing terminal market share.

During 1980 IDC said that 84% of the total revenue attributable to the clustered processing terminal market came from DDP. By 1985 IDC expects a 95% jump in the portion of clustered terminals in DDP applications.

Over the next three years, the small business computer market reportedly will continue to be a strong influence on the DDP market. Originally intended for small, single-site business applications, small business systems have found their way into DDP.

While the design of small business computers tends not to lend itself to DDP, vendor options and third-party enhancements have made DDP an accessable alternative to small business users, IDC said.

Other Problems

However, aside from the DDP question, the small business computer market has other problems. IDC said that a squeeze is on from the minicomputer vendors at the high end and desktops at the low end. This competition may sap the strength of the small business market, IDC said.

The typical user of a distributed small business system is one where the distributed nodes are geographically distant. However, certain applications are needed at a relatively small cost. There also tends to be a need to use common applications and report to a host site, IDC said.

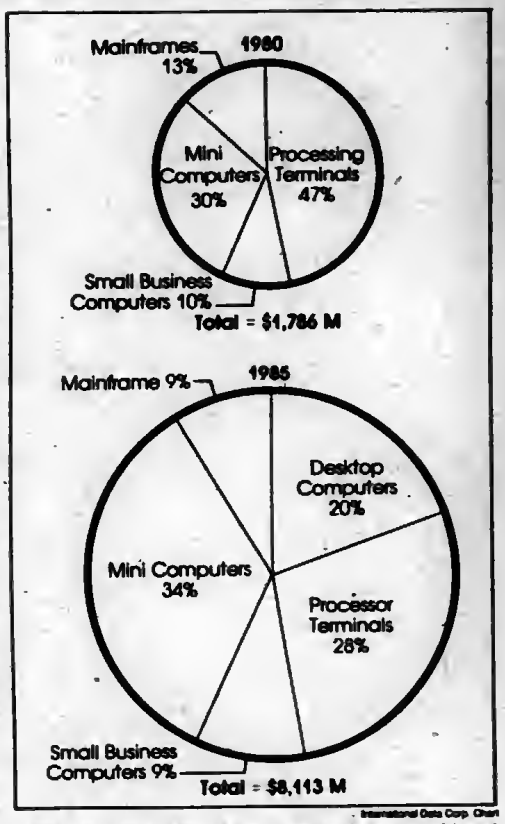
At the upper end of distributed processing are minicomputers. By nature these general-purpose processors are suited for DDP applications. IDC predicts the minicomputer market will continue to grow, and the top minicomputer vendors will continue to make announcements that offer greater DDP support.

"Minicomputer vendors have long recognized the opportunities that exist in DDP and have been consistently attacking the DDP market," the report noted. Clustered terminals have a larger presence in the market, but IDC predicts the sheer size of the minicomputer market will catch up to the processing terminals market.

Users will look for either low-performance, low-cost microminis or top-of-the-line superminis. Microminis are attractive because many vendors are now offering enhanced capabilities that offer more power. The low-end processors can be used as nodal computers or incorporated into an actual DDP workstation. In addition, the units can be used for dedicated tasks such as file servers, and print servers, IDC said.

Superminis, on the other hand, can be used as application or central file processors in a DDP environment, according to IDC. IDC predicts that the average value for a minicomputer used in a DDP environment will go up slightly over the next few

(Continued on SR/6)



International Data Corp. Chart

These pie charts show the percent of dollars in shipped DDP products in 1980 and 1985. The 1980 figures do not show desktop computers, whose percentage that year was too small to represent.

DDP Elements	% 1980	% 1981	% 1982	% 1983	% 1984	% 1985
Desktop Computers	0	2	5	11	16	20
Processing Terminals	47	39	38	34	31	28
Small Business Computers	10	10	10	10	9	9
Minicomputers	30	33	33	34	32	34
Mainframes (Size Class 2, 3, 4)	13	16	14	11	12	9
TOTAL DDP SYSTEMS $ VALUE	100	100	100	100	100	100

International Data Corp. Chart

Percent of Dollars Shipped by Category to DDP Markets
U.S. Market Only, 1980-1985

RJE and DDP: What's the Difference?

By Donald M. Quirk
Special to CW‡

Like most buzzwords, distributed data processing (DDP) has been defined and redefined until there are more than enough definitions to explain the technology.

One of the most common misconceptions of a distributed system is that it and remote job entry are one and the same. In fact, although both seem to be closely related, they belong to two different worlds.

In a typical remote job entry system, a worker at a remote location submits a job through cards and a few minutes or a half-hour later receives output in the form of a completed report.

The major function of remote job entry is to extend the reaches of a central computer to a remote location and, based upon what it was designed to do, it did its job very well. The remote job entry terminal is generally connected to the central site through leased lines, although dial-up lines are sometimes used.

In DDP, however, the main objective is not so much to extend the reaches of the central computer, but rather to distribute intelligence and computer resources throughout the branch offices and various organizational units of a major organization.

Here the intention is to give each organizational unit its own computer resources in order to let the units use those resources to solve their own problems and perform their own processing. This not only cuts down on bureaucratic red tape, but also eliminates the exorbitant line costs associated with connecting every organizational unit of a major organization to one central computer.

When communication does take place, it can be done after-hours using switched lines rather than leased lines, which can be inordinately expensive.

In a typical DDP environment, minicomputers, small business computers or other DDP-type systems are used to process transactions during the day, with the results being forwarded to the central host at night. The central site can in turn forward reports or updated master files back to the DDP locations for use during processing the next day.

Because of the proven effectiveness of 2780/3780-type design protocols most major manufacturers of DDP equipment, including IBM, adopted these protocols when designing communications utilities for their systems. They then announced that their products were compatible and could be used in conjunction with the RJE transmission links already being supported by IBM on their mainframes.

There are a number of major flaws, however, in the above-mentioned RJE links when they are used in conjunction with DDP systems. (Given the fact that these links were not designed to support communications with DDP systems this is not surprising.)

Power and Hasp

One of the major disadvantages of Power and Hasp is that they do not support unattended communications at the remote sites. This is important for two major reasons. The most obvious of these is that it requires an operator at each of the remote sites to support communications. This can be quite expensive.

The second reason, although not as obvious, is equally important. By running unattended communications, data transmission can take place after 11:00 p.m. when there is a 60% reduction in phone rates.

When one considers the fact that the average annual phone bill for a DDP system with just six remote workstations (20 minutes per terminal) is about $12,000, one realizes that there are substantial cost savings involved here.

Unlike remote job entry links, batch-oriented programs — such as the Batch Communications Program (BCP) recently made available by Computer Dynamics, Inc. of New York — support unattended communications. They also allow communications to take place after 11:00 p.m. with substantial reductions in communications costs. These cost savings increase as the size of the network grows.

The second major disadvantage of remote job entry-type transmission links is that they require a great deal of operator intervention and control at the central site. Batch communications programs completely control the communications environment without the need for any operator intervention. This becomes especially important as the size of the network grows.

Through these and other procedures the programs completely control the entire communications network.

Quirk is president of Computer Dynamics, Inc., a telecommunications consulting firm located in New York City.

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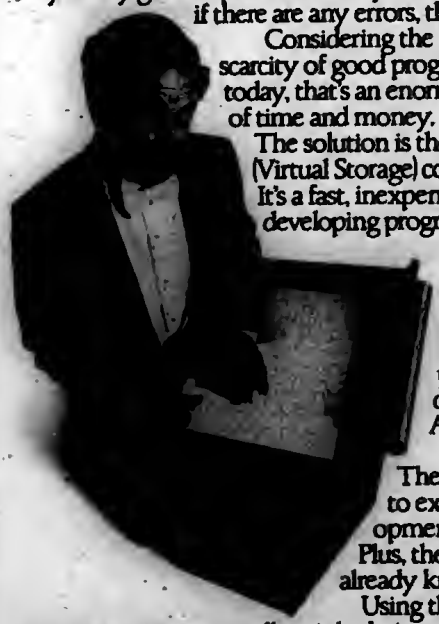

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Centralize? Decentralize? Distribute?

Where to Put Data Depends on Application

By Grayce M. Booth
Special to CW‡

The predominant form for information systems in the 1980s and beyond will be what today is called distributed data processing (DDP). However, there are some applications that are better suited to a centralized structure and some that are best implemented as decentralized systems.

There are many factors involved in deciding whether to centralize, decentralize or distribute application functions. And the decision must be made by evaluating those factors and their interrelationships. The relevant factors are presented here in the form of a series of questions. The answers to these questions, as they relate to a specific system, will indicate the most appropriate choice of system structure.

1. Capacity. Are the capacity requirements of the application too great to be implemented in a single computer system?

An application's needed capacity is determined by the total number of users to be served, the number of users who will access the system simultaneously, the volume of transactions to be handled, the response-time requirements, the size and complexity of the data base and the complexity of the processing functions. It is also necessary to allow for expected growth; 10% unused capacity for growth is a practical

(Continued on SR/6)

Defining Terms First Step in Choosing System

By Grayce M. Booth
Special to CW‡

Is the organization's managerial style in favor of distributed control?

It is important to note that the term "decentralized" is usually applied to the management style referred to here as distributed. However, decentralized management responsibility does not mean the same thing as decentralized information processing — which consists of free-standing, independent systems. Calling this management style distributed accurately reflects the fact that it involves the allocation of certain types of responsibility to various levels of management, but with ties of reporting and control to and from top executives.

Although it is possible to provide some degree of distributed control in a centralized system, a greater degree can be provided in a distributed system.

In an organization with a philosophy of distributed control, therefore, applications ought to be studied for their suitability to a distributed system. In contrast, an organization that wishes to maintain close control over the information systems may find a centralized structure more desirable.

All programming can be performed by a central staff, and the management of the computer equipment can be tightly controlled. However, the increasing computerization of mainline organization functions makes the centralized approach progressively less practical.

Technical Risks

Finally, what kind of a technical risk is involved if a specific system structure is selected?

One of the major advantages of a centralized system is that so many DP professionals are familiar with this approach. The greater the degree of experience in the use of a particular technique, both locally and in the industry as a whole, the lower the technical risk. Similarly, a decentralized system represents a low technical risk since, for practical purposes, this is the same as multiple centralized systems.

For most organizations today, a distributed system represents a higher technical risk than either a centralized or decentralized system. However, the level of risk will diminish steadily as the level of collective experience rises.

If there is no local experience with distributed systems, it may be possible to minimize the risk by using prototype implementations as a learning tool. It also may be appropriate to define a loosely coupled distributed system, as this is very much like a decentralized system. Complexity, of course, reduces flexibility and reliability, so avoiding complexity is a good general rule.

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Computer Automation believes that data processing should fit your business, rather than altering your business to suit the computer.

For example, consider a company whose functions are performed not only at HQ, but also throughout a network of divisions and depots etc.

Should they choose mainframe, mini or micro?

A mainframe can provide the ultimate power, but at prohibitive cost in resources when serving users in diverse locations.

A minicomputer would be better at interactive processing, but lacks the power to service an entire organisation.

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Where to Put Data Depends on Application

(Continued from SR/5)

minimum, and e great many systems require e higher percentage.

Allowing e cushion of unused capacity is most important in systems that provide ad hoc query and reporting facilities. These tend to attract new users rapidly, and the resulting growth is difficult to predict. Rapid and unpredictable growth also is common when office-related functions such as electronic mail are implemented. These facilities tend to be "habit forming" once users have discovered the advantages provided.

In some cases the required capacity, including adequate provision for growth, can be supplied on a system already used by the organization. However, even in that case, the remaining questions ought to be analyzed to ensure that other factors support the decision to centralize functions.

In other cases, capacity requirements may dictate the need to explore distributed or decentralized alternatives because the requirements — present and/or future — cannot be met on one system. One solution that is often chosen is to use multiple computers co-located in one center and partition the work load across them.

In many cases this is a de facto decision to select a distributed-system structure, even though the "communications links" among the systems may be people carrying reels of magnetic tape for data exchange.

Today, configurations of this type are more often connected via high-speed bus, forming e local-area network. In other cases, the application, upon closer examination, can be partitioned to fit on two or more decentralized computer systems without any data exchange. However, as the complexity of business, government and society in general causes an increased volume of data flow among applications, very few decentralized systems will prove viable.

2. Flexibility. Is e high degree of flexibility for change and/or capacity expansion required?

The greater the degree of expected change, the less advantageous the centralized system will be. A centralized system typically encompasses a large number of epplications, possibly unrelated except for the fact that they are executed on the same computer equipment.

Systems of this type can be extremely complex, and one of the basic rules of information systems is that complexity reduces flexibility. Information systems which serve mainline operational functions of an organization must be eble to change as rapidly as the organization'e environment changes.

3. Availability. Are there requirements for a high level of availability and/or e high degree of resilience to failures?

Centralized systems are naturally vulnerable to single-point failures that affect the location where they operate. There are many ways to minimize this vulnerability, such as installing battery backup for power failures. However, natural disasters such as fire and flood, and unnatural disasters such as sabotage, are difficult to guard against and the precautions used may be expensive.

In e distributed or decentralized system it may be possible to achieve the necessary level of evailability by selective, rather than total, duplication of components. Only the hardware, software and data that are essential to continued operation can be backed up, while less expensive protection methods are used for other elements. Distributed and decentralized systems typically are dispersed over multiple sites and, therefore, are less vulnerable to single-point failures than centralized systems.

4. Processing Mode. Which mode of processing will predominate: interactive or batch?

The more interactive the system, the greater the likelihood that the distribution of et least some functions will be advantageous. Batch-processing systems are not good candidates for functional distribution, as several of the major advantages of distribution — improved response speed, higher availability, ebility to tailor for local needs, ebility to distribute managerial control — apply poorly or not et all to batch systems. Systems that are predominantly interactive and/or that handle real-time I/O are good candidates for a distributed-system structure.

5. Clustering. Are there clusters of shared functions, each of which serve a separate group of users?

If each group of users has related functional requirements, and especially if each group is separated geographically, the probability is high that e distributed system will be a good choice. The clustering of functions, in effect, defines the distributed-system structure. If each group of users is completely independent, with no need for data exchange with other groups, then e decentralized structure may be appropriate.

6. Customization. Are there user groups who need somewhat different functions, methods, interfaces and/or reports than other similar groups?

Even though e large number of users may share the same general set of requirements, some users or groups of users may have different specific requirements. For example, a bank may have multiple branches, all of which provide the same set of services to their customers.

However, because of its geographic location, one branch may have e much higher than average proportion of savings accounts to checking accounts. As an example, several factories might build the same products, but local conditions might call for different procurement procedures.

Designers of computer-based information systems too often attempt to smooth out differences so that e single processing method can be used. Forcing users, methods and procedures into a single mold for the sake of computer-system efficiency often results in decreased human efficiency. When computer equipment was extremely expensive, that might have been e justifiable trade-off.

Today, however, the cost of salaries and wages, when contrasted with the cost of computer hardwere, makes it important to minimize human effort and maximize human efficiency.

It is, of course, perfectly possible to provide customization in a centralized system. However, this is seldom done in practice, and customized functions mey be difficult to maintain. Customization in a centralized system typically results in increased complexity, which limits the flexibility to change.

7. Security and/or Privacy Protection. Will the system handle data and/or functions that require tight protection for security or privacy reasons?

An analysis of security and/or privacy requirements may indicate ways to partition sensitive data or functions from nonsensitive ones. In that case, it may be possible to design a distributed system around the partitions so that protection can be concentrated on the sensitive areas. Protection inevitably adds to cost, so it is important to protect only sensitive system components.

The need for tight protection may suggest that e centralized system is best, or if e distributed structure is chosen it may best remain e locally distributed one. In any case, the physical protection provided by a restricted-access computer center makes it easier to handle sensitive data or functions.

8. Geographic Considerations. Are the users widely dispersed geographically?

If the answer is yes, chances are that a distributed system will lower the cost of communications, and it may also improve the speed of response to terminal users. "Widely dispersed" does not necessarily mean that users are separated by thousands or even hundreds of kilometers.

The essential choice is whether to connect geographically separated users to a central location or to connect terminals to local processors, each serving e cluster of users. The latter typically will result in lower overall cost for the system.

9. Loosely Coupled Functions. Does the system consist of a set of loosely related functions or of functions whose requirements are not well defined?

In these cases, a distributed system, or possibly a decentralized system whose processors later will be linked to form a distributed system, is usually the best choice. If each set of functions is allocated to e separate computer, there is considerable flexibility to evolve as changes are needed.

Office systems, as well as many other as-yet-poorly defined epplications, are made up of clusters of related functions. A distributed system provides greater flexibility than a centralized system to change each set of functions as needed.

10. Cost. Will e distributed system result in lower total life-cycle costs for the system?

Placing cost last in this list of questions does not mean that it is the least important. However, cost cannot be evaluated until e first cut is made et choosing e system structure.

It is important to include all relevant costs and to compute these for the expected life cycle of the system. The costs to be considered include hardware, systems software, epplications software, communications facilities, maintenance, supplies, training, facilities, operations and end-user costs.

In some situations total costs are lower if a distributed system is chosen. This is particularly true if the cost of communications facilities in e centralized system can be reduced by using local satellite processors.

In other systems, the comparison of costs emong different possible structures has resulted in e somewhat higher expected cost for e distributed than for e centralized system.

This article is en excerpt from a forthcoming McGraw-Hill book, The Design of Complex Information Systems, *and is reproduced here with permission. Grayce Booth is menager of special projects for Honeywell, Inc.'s Marketing Support Operations/Large Information Systems Division in Phoenix, Ariz.*

Multifunction Systems Market Seen Growing 100% per Year

(Continued from SR/3)

years. Superminis oriented for DDP environments are getting more expensive and smaller nodal processors are, at best, holding even.

IDC noted multifunction systems perform data base query operations in e one-way manner. Most managers will probably want extended query capabilities along with greater word processing support, IDC said.

The advantage of word processing, IDC pointed out, is that it tends to be very easy to learn and its capabilities extend beyond just writing letters. It can be used for electronic mail, confidential memos and personal use. The ability to merge word processing with DP will be a critical development in DDP.

Users will be able to merge data base developed reports with text from the word processing capability, IDC said.

Communications will be the backbone of the multifunction system. It will consist of local-area networking capabilities and the ability to transmit data over long distances. The local-area networks will be slightly more important than the long-haul networks because of the amount of traffic that will be carried on the local nets.

IDC predicts the cost per connection fee for networks will have to reduce significantly before local-area networks are widely accepted.

The IDC report is part of the firm'e Continuous Information Services. The firm is located at 5 Speen St., Box 995, Framingham, Mass. 01701.

Ease of Use

Superminis Better Bet Than Minis in DDP Net

By Dale Sutton
Special to CW‡

Minicomputers and superminis can be used effectively in a distributed data processing (DDP) network. But the whole issue of using minis and superminis for DDP needs to be examined more closely.

Let's begin by defining a minicomputer and a supermini. The distinction between the two has been fuzzy in the past, but we can draw some sharp differences. A minicomputer sells for $50,000 or less (processor only), has an 8-bit or 16-bit word length and is usually used for interactive or real-time applications. Minicomputers are also relatively slow and inflexible in terms of expansion capabilities.

A supermini, as the term implies, is larger — and more expensive. The CPU ranges from $50,000 to $200,000, with a total system between $100,000 to $500,000. Word-length size is usually 32-bit.

A supermini provides the processing power and memory necessary for applications that formerly ran only on mainframes, as well as the interactive capabilities and ease of use the less experienced DP user is looking for.

The major advantage of a 32-bit computer is its ability to directly address very large real or virtual memory. The 32-bit machine can handle 16M bytes, in contrast to the 128K bytes addressed by a 16-bit machine. A supermini can be expanded more readily than an 8- or 16-bit mini.

The market for superminis is increasing at the rate of 35% to 40% annually, making it the fastest-growing segment of the minicomputer marketplace. Superminis are used across the spectrum of business applications — manufacturing, finance, office automation and engineering. Users are developing and buying software that gives them interaction with the computer in areas where they previously had no access.

There is also a growing trend to off-load programs from mainframes to smaller computers, which reduces response time or turnaround time and gives the user closer access to and control over specific applications.

In planning a DDP network the requirements of both the existing data center and the new users must be considered and integrated into a compatible system.

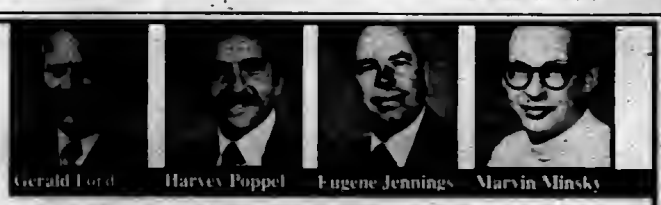
The 32-bit supermini may be the best choice for DDP because it meets the needs of the user and the data center. Let's look at the DP user's needs:

- **Independence.** The user does not want to depend on the data center for necessary computing power and wants more timely, individual response.
- **Ease of Use.** The system must be simple enough for non-DP personnel to operate. The user does not intend to compete with the data center — just get the job done with a minimum of effort.
- **On-line Processing.** The user wants immediate answers — not the delays associated with the batch data center.
- **Communications to the Mainframe.** The user needs to retrieve data from and furnish data to the corporate data base to keep it current.
- **Reliability.** The best DDP system in the world is of no use if it's down.
- **Troubleshooting.** When hardware, software and communications all interact, as they do in a distributed environment, problems are hard to isolate. The user needs responsive support when the inevitable problems arise.
- **Software Availability.** The user wants to use existing software. Software development is time-consuming, expensive and requires expertise many users don't have.
- **Expansion Capabilities.** Users need a system that will meet current needs with a minimum of expense and downtime — one that will be able to grow to meet future computing needs.

The data center shares some of the same requirements, but has other concerns also. Let's look at its unique needs.

- **Control of Computerization.** DP management is concerned about the ability to support users if many different systems, software versions and interfaces are used.
- **Compatible Software.** Fewer resources are expended on support and maintenance when the software used by the data center and remote sites is compatible at the highest level possible. Compatibility also results in a more efficient network.
- **Maintain Current DP Staff.** The data center personnel should be suf-

(Continued on SR/8)



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Superminis Seen Good Bet in DDP Net

(Continued from SR/7)

ficient to support distributed systems and applications. The DP manager does not want the overhead of several staffs of programmers and systems engineers.

• **Consistent Long-Range DP Plan.** If a three- to five-year plan is not in place, one should be established. Hardware and software acquired should be consistent with that plan. Short-term, inconsistent solutions are often very costly in the long run.

There are a number of 32-bit computers that meet all or most needs of the DDP user and the data center. The fit will be even better if the company looking for a DDP solution has a well-defined and coordinated plan for management information systems (MIS) management.

Choosing a System

Assuming that you are sold on a supermini for DDP, there is still an important question to be answered: Which one should you acquire? Here are a few guidelines:

• **Single Vendor.** To meet the needs of both the user and data center for a reliable and well-supported system, the single-vendor approach to building a DDP system is important. The total system approach ensures compatibility between different components of the system and provides support for peripherals as well as the CPU.

A number of vendors offer superminis in a complete system, including: Formation, Inc.; IBM; Hewlett-Packard Co.; Digital Equipment Corp.; Data General Corp.; Prime Computer, Inc.; and Systems Engineering Laboratories, Inc.

• **Communications Capabilities.** Networking capabilities between remote sites and the mainframe provide user groups and the data center with the ability to communicate and access each other's data. Since so many data centers use IBM 370s, a link to that system is important. Many 32-bit machines offer not only network capabilities between like machines, but also communications with a 370 via 2780-type links or 3270 emulation.

• **Software Compatibility.** This is also an important requirement of the data center and remote systems.

This is much easier to achieve with a 32-bit machine than with a smaller minicomputer — which is not to say it's easy. Some systems are compatible with their own larger computers; others address that issue by offering 32-bit machines that are software-compatible to the large machines like the IBM 370.

The architectural differences in the mainframe and the minicomputer are transparent to the software so that remote users can run the same software as the data center. A 370-compatible system also gives the user access to a huge library of developed and proven software.

• **Reliability.** Keeping downtime to a minimum is a high priority requirement for all users. Remote support and diagnostics — offered by several supermini manufacturers — help to achieve that goal. This, in turn, reduces the number of personnel needed for support and keeps the support function the responsibility of the data center.

For total reliability, a few vendors of 32-bit machines offer redundant capabilities. This is particularly desirable if the user is running critical applications, if the site is very remote from a service center or if the user is dependent on interactive applications. Waiting for a service call usually means four to six hours of downtime — too long in most organizations.

There are several approaches to configuring a redundant system. Most vendors, such as Tandem Computers, Inc., offer duplicate hardware components.

Formation's, on the other hand, has redundant components that are said to enhance system performance. In the event of a failure, the system shuts down and reconfigures itself to replace the failed component. Processing resumes in a slightly degraded manner until repairs can be scheduled. Typical downtime is three to five minutes.

• **Expandability.** The ability to expand the system is essential as computing needs increase. A system that is field-upgradable is the most flexible solution to this problem.

Many minicomputers and superminis fill some of the requirements for a DDP system. A few 32-bit machines also offer redundancy, remote support and software compatibility with the IBM 370.

With an understanding of the DP capabilities that exist, the requirements of the data center and the users and projected future needs, the MIS director will find that the 32-bit superminis have a definite place in a distributed system.

Sutton is manager of product marketing and support for Formation, Inc. of Mount Laurel, N.J.

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Host Bigots and Mini Bigots Squaring Off in War

By Larry Woods
Special to CW‡

Distributed processing has become an emotional issue between two groups: the host bigots and the mini bigots.

Host bigots, primarily management information systems (MIS) personnel, believe all computing should be done on large, centrally located mainframes — under their jurisdiction.

And mini bigots, usually users, believe most, if not all, computing should be performed on smaller, stand-alone computers — controlled by them.

An organization that is faced with this problem, but chooses to ignore it, can expect to spend a lot of unnecessary time and money.

The essential issue is between a coordinated organizationwide plan for computing or successful distributed data processing (DDP) and the continued haphazard proliferation of computing power: computing anarchy.

For several years, users have been purchasing their own computers and storing their own data, disregarding any possible need for this data by others in the organization. They develop their own applications programs, unconcerned by the redundant nature of their local systems, creating, in effect, their own systems departments.

Determine How and Why

Before it can remedy this situation, MIS management must determine why and how this uncontrolled acquisition of computing power is happening. Stopping the waste and the misappropriation of organizational resources should begin with an examination of flow well user needs have been satisfied.

The effectiveness of an MIS department in responding to users' needs can be better understood after surveying their needs and expectations. Users generally demand:

- Immediate response to their application development needs.
- Systems that provide solutions to their problems and are flexible enough to reflect the rapidly changing business environment.
- A user-friendly interface.

These demands have changed greatly since the computerizing of business systems began in the early '60s. By replacing labor-intensive manual operations, these elementary systems saved large amounts of money, and users who were unfamiliar with or overawed by the computer willingly relinquished control and

DDP Presents New Challenge For MIS

By Larry Woods
Special to CW‡

Although the fruits of distributed processing may be shared by a variety of departments within a company, it may be necessary to limit computer purchasing authority to those directly involved with management information systems (MIS).

However, concentrating computer acquisition and implementation efforts within this department obviously puts new responsibilities on MIS personnel.

The MIS department must draw the mini user and the personal computer user back into the organizational computing fold, offering them the real benefits of data access and improved response times. Staff members must constantly monitor the changing computing environment for newer and more effective methods to solve the organization's problems.

The proper management of data can be ensured only when the computing resources that are using it are centrally controlled. To ensure the integrity of the data, control and coordination must, again, rest with MIS.

This department must acknowledge the needs of today's computer users, furnishing appropriate types of computing power along with the software tools that will allow users to function effectively. If this is not done, users may elect to do it themselves.

The challenge is a large one. MIS must orient itself toward satisfying the needs of users who see their work environment changing rapidly and who need immediate help. At least part of this help will involve the use of computers other than the traditional host mainframe.

Various forms of distributed computers, installed either randomly or in a coordinated manner, will eventually be part of the total computing picture in most large organizations. Whether the MIS department is a leading part of this direction will be determined by MIS management.

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Between DDP and Small Computer Anarchy

responsibility to the MIS department.

Now, however, the situation has changed and MIS departments are considered negligent in serving users.

One of the most dramatic changes has been a demand for immediate MIS department response to the user's rapidly changing business environment. The financial volatility that can create huge gains or losses must be constantly monitored, and demands for greater productivity require the collection and processing of larger amounts of previously unavailable data.

To compound the problem, more emphasis is now being placed on data accuracy. How are MIS departments addressing this need for immediate, accurate response to application development needs?

A survey in the early '70s showed an average two-year application development backlog in the MIS departments of major U.S. corporations. This backlog has now grown to more than four years. Ironically, it is the success of the MIS department — showing management the significant value of computerizing procedures — that has contributed to this situation.

With users thoroughly convinced of the computer's value, MIS departments are unable to handle their demands. Increasingly, users request solutions to problems they know the computer can solve, and the MIS department cannot grow rapidly enough to accommodate them.

The complexities of the computing environment add further delays; data bases and data base management systems require additional expertise, and new programming techniques carry with them the overhead of program walkthroughs and structured systems review.

Users do not understand the MIS bureaucracy that shuttles inquiries and requests from group to group until they retreat with their problems still unsolved. At this point, they typically do one of the following:

- Ignore the problem and hope it doesn't come back to haunt them.
- Change departmental procedures and solve the problem manually.
- Look for an automated solution on their own.

It is this third solution that the MIS department should fear the most, but usually considers the least. Too frequently, MIS personnel believe that users in their departments cannot program computers or that if they can, they will shortly return to MIS, begging for help. With increasing frequency, however, users are not returning.

Users are additionally frustrated because they feel perfectly capable of programming the applications themselves. This in turn puts additional pressure on the analyst, who discovers that users are no longer dazzled by his knowledge of computers. The result is discord within the organization — and users who will look elsewhere for computing. Users expect more from their interface with the computer than they did in the early '60s when they received paper that had been generated by a batch process. In the early '60s users interfaced with the computer through punched cards or input forms. The inner

(Continued on SR/12)

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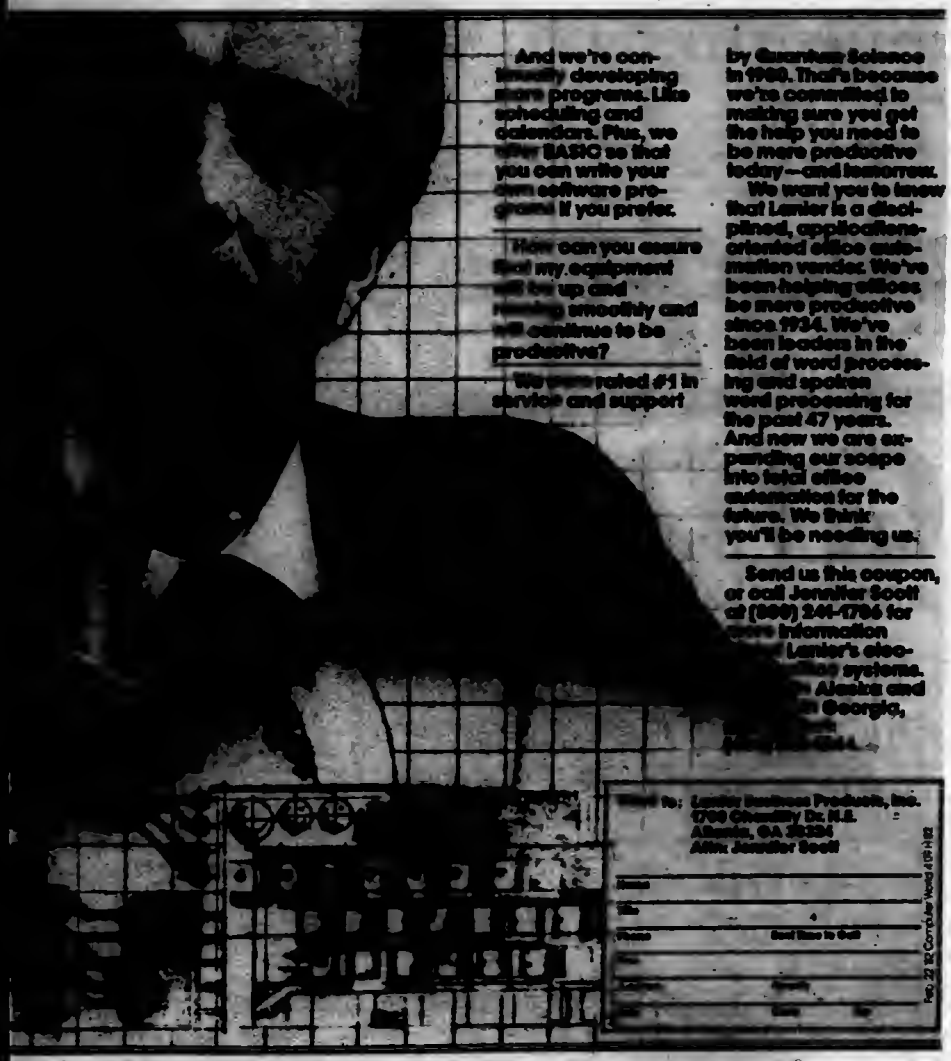

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First Step For MIS: Survey Future Needs

By Larry Woods
Special to CW‡

The first step for the management information systems (MIS) department in developing a distributed processing plan is to survey the future needs of the organization. Then one must examine different methods of computing to meet those needs.

The following topics should be addressed:

- Corporate direction (long- and short-range objectives and goals, tactical and strategic plans).
- User needs (short- and long-term management needs, operational management needs).
- Technological directions (mainframes, minicomputers, personal computers and communications.

The study results should give the MIS department sufficient knowledge to initiate a plan that will satisfy user needs. When this plan has been completed and approved by MIS management, top management must be approached for approval.

Finally, the approval of top management must, of course, be relayed to lower levels of management and their staffs, and the necessity of centrally coordinated computer planning must be accepted by all who need computing power — whether present or anticipated.

DDP and Mini Bigots Squaring Off in DP War

(Continued from SR/11)

workings of the computer were completely hidden.

Although on-line systems have now put users in direct contact with the computer, this relationship is too often less than pleasant.

Today's business user frequently owns a home computer and is accustomed to rapid response, a forgiving computer and a wide variety of low-cost programs. These users feel they understand computers and know what can be bought for the approximate cost of using a large computer for one month.

Why Users Decentralize

Many users are not satisfied with delays in solving their problems. They have become disenchanted with both the MIS department and their computer facilities. They choose their own course of action — looking to the minicomputer or microcomputer industry for solutions. However, he must now attempt to interface with the mainframe. How does he do it? Is it possible? And will the bypassed MIS department cooperate?

This introduction of minicomputers into user departments with no central coordination or control may eventually lead to a very costly situation, with the potential for disaster. The proliferation of stand-alone computers could conceivably lead to a complete loss of control of the organization's data, making it useless. The responsibility for altering this situation rests with the MIS function.

Corporate computer users have options that may satisfy their immediate computing needs, but that may bring about the corporate data access problem that was examined earlier. An organization with pockets of alienated computer users can expect this uncoordinated acquisition to continue — and to accelerate.

Combatting the situation calls for a carefully planned and executed strategy to take advantage of the interest in individualized computing and turn what may seem like anarchy into a controlled distributed processing environment.

Acknowledge Existence

The MIS department must first acknowledge the existence and appeal of these alternate forms of computing. Along with "bigger is better," the hidden-cost argument offered by the MIS department is losing much of its punch. It is true that users do not always consider all the additional costs of these initially low-cost minicomuters.

As costs continue to drop, however, the smaller desktop computers should approach the computing power of the minicomputers, without requiring their clean environments, software support and so on.

In addition, the small computers fall into the commodity price range where disposal is an alternative to repair. System software support also becomes less critical on a small computer that can be justified for a single application.

It may well be that a given class of applications lends itself to the use of minicomputers, and personal computers can frequently provide a good management tool.

Software can be found to allow these various computers to communicate with one another and with the organization's mainframe — the keeper of the corporate data.

Fortunately, many manufacturers of minicomputers and personal computers offer network capabilities. And there are viable products in the mini and personal computer fields that can coexist with large mainframes.

This article has been excerpted from Personal Computers versus Distributed Processing, *a forthcoming Auerbach Distributed Processing Management portfolio prepared by its consulting editor, Larry Woods.*

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Systems Rated

Survey Pinpoints Users' Concerns About DDP

By Tom Henkel
CW Staff

CHERRY HILL, N.J. — More vendors are getting into distributed data processing (DDP), service is getting worse and users are becoming more concerned about interfacing and communications support in distributed applications.

Those are just a few trends noted in a recent DDP report published by Management Information Corp. (MIC) here.

Other trends in DDP include a swing to buying expandable processors, a continued popularity to a centralized host processor in a star network and more users mixing vendors' hardware.

MIC contacted 210 distributed users. Companies contacted had annual sales ranging from less than $10 million to more than $1 billion. The firms were polled on their specific DDP and data communications equipment on the basis of ease of use, performance, service and manufacturer support, the firm said.

User Increase

According to MIC's figures, DDP users in the $25 million and under range more than doubled in the past year. Users in the less than $10 million range jumped from 5.9% in 1979 to 19.7% in 1981.

Asked how long they had been using a distributed system, 90 companies said they have been using DDP for more than five years. Out of the 204 respondents, 55.9% said they currently used a distributed system. Of those users, 48 said they planned to implement a distributed aystem in the next five years.

IBM tops the dominant supplier list, according to users. Of those users currently employing a DDP system, 25.2% had IBM equipment, 11.8% used Digital Equipment Corp. hardware, 9.8% used Radio Shack equipment, 8.7% used Datapoint Corp. and 4% used Honeywell, Inc. hardware.

The report concludes that other vendors are making stronger inroads into the DDP market. In 1979, for example, IBM had 64% of the DDP market.

Users were asked to rate their distributed processing hardware on a scale of 1 to 4. One was considered poor and four was considered excellent. The ratings covered hardware performance (the user's expectations with relationship to the stated equipment specifications), reliability (uptime vs. downtime), ease of use (the amount of time needed to train new personnel) and manufacturer and vendor support (maintenance and available vendor training).

MIC offers a special recognition for systems that achieve a point score of 3 or higher in each category. IBM dominated the special recognition list with a number of products — its 5280 (an average rating of 3.88), 3033 (3.50), 4300 (3.38), System/34 (3.32) and 370 (3.16).

Other vendors that achieved the special recognition status included Hewlett-Packard Co.'a HP 3000 (3.48), Sperry Univac'a 1100 (3.42) and Texas Instruments, Inc.'a 990 (3.40), MIC said.

An honorable mention, of sorts, was given IBM'a 8100, which fell short by .2 in the ease-of-use category.

Equipment	Total Responses	Performance	Reliability	Ease Of Use	Service	Manufacturing Support	Average Grade
Amdahl	3	4.00	3.67	3.67	4.00	3.33	3.73
Apple	12	3.45	3.45	3.36	3.00	2.55	3.16
Burroughs							
1700, 1800, 1900	4	3.75	3.75	3.75	3.00	2.50	3.35
2900	6	3.44	3.22	3.44	3.44	2.89	3.29
4700, 4800, 4900	7	3.29	3.14	3.43	2.57	2.43	2.97
CDC	4	3.00	3.00	2.50	2.75	2.25	2.70
Commodore	3	2.67	2.67	3.33	3.00	2.00	2.73
Data General							
CS	6	3.00	3.00	2.83	2.67	2.67	2.83
Eclipse	2	3.00	3.00	2.00	2.50	2.00	2.50
Nova	7	3.00	3.00	3.17	2.67	2.17	2.40
Datapoint	11	3.18	3.09	3.36	3.16	2.55	3.07
DEC							
PDP-11	37	3.33	3.25	3.19	2.89	2.61	2.97
PDP-8	3	3.00	3.33	2.33	1.67	1.67	2.40
Sys. 10, 20	4	3.50	3.00	3.50	3.25	2.25	3.10
Four Phase	6	3.17	3.67	3.17	3.00	2.50	3.10
Harris	4	3.75	3.50	2.00	3.00	3.25	3.20
Hewlett-Packard							
2000	10	3.40	3.20	3.20	3.00	2.40	3.04
3000	10	3.50	3.70	3.60	3.50	3.10	3.48
Honeywell							
L/6	6	3.00	2.50	2.83	3.00	2.40	2.75
L66	9	3.00	3.11	2.67	2.89	2.58	2.85
2000	5	2.80	2.60	3.60	2.80	2.20	2.75
2030	4	3.25	2.50	2.50	2.50	2.00	2.55
IBM							
S/3	16	3.16	3.25	2.75	3.13	2.63	2.99
S/34	16	3.35	3.59	3.24	3.35	3.06	3.32
S/38	4	4.00	3.67	3.00	3.33	3.33	3.47
3033	22	3.64	3.64	3.14	3.59	3.50	3.50
370	60	3.31	3.23	3.00	3.23	3.04	3.16
4300	41	3.47	3.65	3.21	3.35	3.20	3.38
5100	3	3.00	3.33	2.00	3.00	2.67	2.80
5280	5	4.00	4.00	3.60	4.00	3.60	3.88
8100	6	3.20	3.40	2.80	4.00	3.40	3.36
MDS	2	3.00	3.00	3.50	3.50	3.50	3.30
ModComp	2	3.00	3.00	2.50	3.00	2.50	2.80
NAS	2	3.00	3.50	3.00	3.00	3.00	2.90
NCR 8000	14	3.00	2.86	3.07	2.43	2.07	2.69
Nixdorf 800	3	3.33	3.00	3.33	2.33	2.33	2.90
Pertec XL	3	3.67	3.33	3.67	3.00	2.67	3.27
Prime	9	3.67	3.56	3.56	2.78	2.89	3.29
Radio Shack	10	2.90	2.33	2.78	2.11	2.00	2.42
TI 990	7	3.71	3.43	3.57	3.29	3.00	3.40
Univac							
1100	6	3.50	3.50	3.50	3.50	3.17	3.43
1910	3	3.33	3.67	3.33	3.00	2.67	3.20
90	11	3.09	3.55	3.55	3.10	2.56	3.17
9300	4	3.25	3.50	3.50	3.25	2.75	3.26
Wang							
VS	3	2.00	1.67	3.67	1.67	1.33	2.07
2200	3	3.67	3.33	3.67	3.00	2.00	3.13
Xerox Sigma	3	3.33	3.00	3.33	1.50	2.00	2.63
	416						

The 210 users polled by Management Information Corp. rated their DDP equipment as shown above.

Data Communications

When it came to data communications equipment, AT&T received more than twice the number of responses as any other data communications equipment vendor listed. Forty-eight users rated AT&T equipment, rating it high in performance, reliability, ease of use and service. However, it received a 2.83 rating in manufacturer support. For that reason, MIC said AT&T fell short of an outstanding rating by .17. The total average grade for AT&T was 3.27, the report said.

In the data communications listing, four controllers and 17 modems were rated. Although three different multiplexer units were rated, none received more than three responses; therefore, none qualified for the outstanding category, MIC said.

Asked how their distributed processing systems meet their needs, 63.2% of 147 respondents said their present system met their needs, and 29.3% said their system did not sufficiently meet their needs. However, 7.5% said their systems had more capabilities than they needed.

Compared to the firm's 1979 survey, when 33% felt their present systema met their needs, the report concluded that users are getting better at choosing DDP hardware.

Users rated major problem areas in existing DDP systems. Interfacing was the most mentioned problem (14% of the respondents). Application software was the second biggest problem (12.2%), followed by data communications (11.8), system software (11.6), cost (8.4%), support and service (7%), management of facilities (6.8%), compatibility with product line (6.2%), flexibility (6%), data capacity (3.8%), expandability (3.4%), program languages (3.2%) and other problems (4.8%), MIC said.

What about DDP in the future? Users said the type of distributed system that would meet their future needs would center around a centralized host processor.

Of 147 respondents, 44.9% said they would own a large centralized processor with remotely distributed micro and minicomputers. Thirty-four percent asid they would own a central processor with various remote terminals, 11.6% said they would use remotely distributed processors, 7.5% said they would have multiple processors at one location and 2% gave other responses.

Three Top Categories

Asked what criteria they used in choosing a DDP system, the respondents rated three top categories.

Reliability was the top criterion (23%), followed by ease of use (15.7%), cost (13.6%), service (9.7%), data communications (8.8%) and software (7.6%). Other responses included the manufacturer'a reputation, upward compatibility and security, the report noted.

(Continued on SR/18)

Satellites Seen Way to Cost-Effective DDP

By Henry H. Wong
Special to CW‡

Information access is the whole theme of distributed data processing (DDP).

Be it tapping into a remote data base, transferring files, sharing resources or initiating and controlling remote tasks, distributing data is useless unless the user has quick and easy access to his files.

Most distributed sites are connected via switched or dedicated lines or packet-switching networks. However, a fully connected network can run into large sums of money because of the ground-based links involved in such a system.

Fortunately, there is another more cost-effective alternative. Users can often cut their communications costs by more than half by joining their remote systems via a communications satellite. For example, the private-line services rate between New York and San Francisco is $1,843, according to figures published last year by the American Satellite Co. (ASC).

However, the one-year contract rate for an ASC satellite connection is $790 per month, while the 30-day cost is $960. All of these rates include channel, local loops and termination charges, plus end-to-end responsibility.

Satellite Business Systems (SBS) is another firm that offers satellite communications services. In fact, through SBS, customers can install rooftop antennas or earth stations that allow higher transmission speeds and eliminate telephone company local-loop charges.

While many people think of a communications satellite as an extraterrestrial switch, its function is actually a little more complicated. These complexities allow the transmission costs to be both affordable and less expensive than ground-based systems.

Satellites utilize a demand-assigned multiple access technology to access multiple distributed processing sites. Basically, this means that since a user does not utilize the satellite 24 hours a day, he is charged only for that time he does use the system.

The amount of traffic a satellite can handle, whether it be broadcast signals or DDP transmissions, is dictated by the number of transponders built into the device. For instance, SBS' Satellite I has 10 transponders while Western Union's Westar IV and Communication Satellite Corp.'s Intelsat V have 24 and 27 transponders, respectively.

Users Share Bandwidth

To overcome the transponder limitations, users share the same bandwidth through frequency and time division multiple access methods. These methods make available a pool of frequencies or stream-of-time slots that are assigned to users on demand.

Other means of stretching a transponder's space include polarization, which utilizes the hemispheric and zone beams to double transmission capacities and spot beam transmissions.

The previous disadvantages of using satellites to link distributed computer sites — such as the plethora of different protocols common to computer systems and unrecognizable to satellites — have been overcome. For instance, most satellites are equipped to handle IBM's Synchronous Data Link Control, Digital Equipment Corp.'s or other protocols.

And if you are planning to give your network a trial run on a communications satellite — without any long-term contract — or are running under an obscure protocol, there are many satellite brokerage firms that are paid to worry about end-to-end communications responsibilities.

All in all, with the progress of the communications satellite the distinction between central and remote processing is virtually eliminated. Each remote computer site communicates with others at equal data rates, resulting in an improvement in DDP services at a minimum of communications expense.

Wong is employed at Global Network Design in Campbell, Calif.

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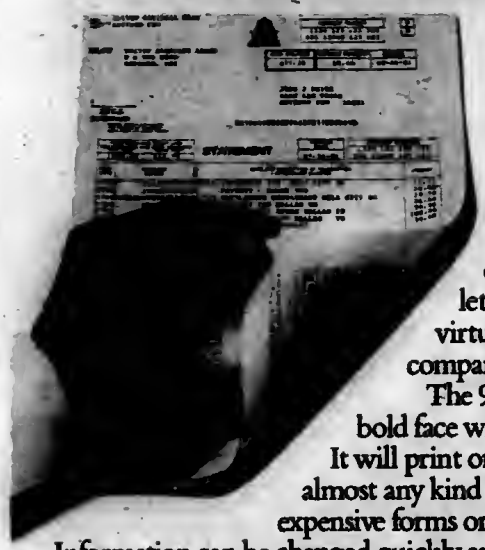

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XEROX

Divisions Share Mainframe

DP Group Operates Without a CPU 'in Site'

Special to CW

CANNONSBURG, Pa. — The Power Systems Group of McGraw-Edison Co. here said it has a normal DP department. There is one little difference, however. It does not have a computer.

The firm deals with an IBM processor several hundred miles away in Arlington Heights, Va. "The unusual thing is that we're neither a distributed processing nor a remote job entry [RJE] site," Alex J. Stafa Jr., manager of systems operation and control, said. "Instead, we are a remote operations site. We have a complete data processing facility, and our operators work the same as if they were operating a mainframe in the next room — even though it is 400 miles away."

About a dozen divisions of the multifaceted manufacturing company share the same 12M-byte IBM 3033 mainframe and 20 billion bytes of on-line disk storage. Each division does its own processing with common software packages, although with individual peripheral configurations at their remote sites, Stafa said.

"Before the consolidation to one mainframe many of the divisions had their own computers and there was redundancy of staff and equipment," Stafa said. "By centralizing, we could estimate this redundancy and also take advantage of the economics of scale. Now we can use powerful equipment and software that none could afford as individual data centers."

Most Processing Done Here

Stafa's operators here still do most of the data processing for the Pittsburgh-based $400 million power systems group, which also has plants in 16 other locations. Data is gathered from the remote plants, consolidated here in the Cannonsburg center, then batch processed on the Arlington Heights computer. After processing, it is then resorted by plant location and retransmitted back to the plants.

Until the end of 1979, the Power Systems Group operated its own IBM 360/65 mainframe here.

The group had reached the limits on the machine, and the alternatives were to upgrade the system to an IBM 370 series processor or use the corporate data center in Arlington Heights. Either way, the group had to face an operating system conversion. Consolidation won out, Stafa said.

Stafa's equipment is on-line to the corporate computer system through a Paradyne Corp. PIX II control system and four 9,600 bit/sec telephone lines.

"We installed the Paradyne equipment because we had unique needs that most RJE equipment couldn't satisfy," Stafa recalled. "We wanted magnetic tape units on the system. Our key-to-disk data entry, data collection and remote plant equipment all output to magnetic tape, so we needed tape drives on the system that look like system tapes to the mainframe. Another reason for the Paradyne system was that we didn't want to give up our computer output microfilm [COM] operation."

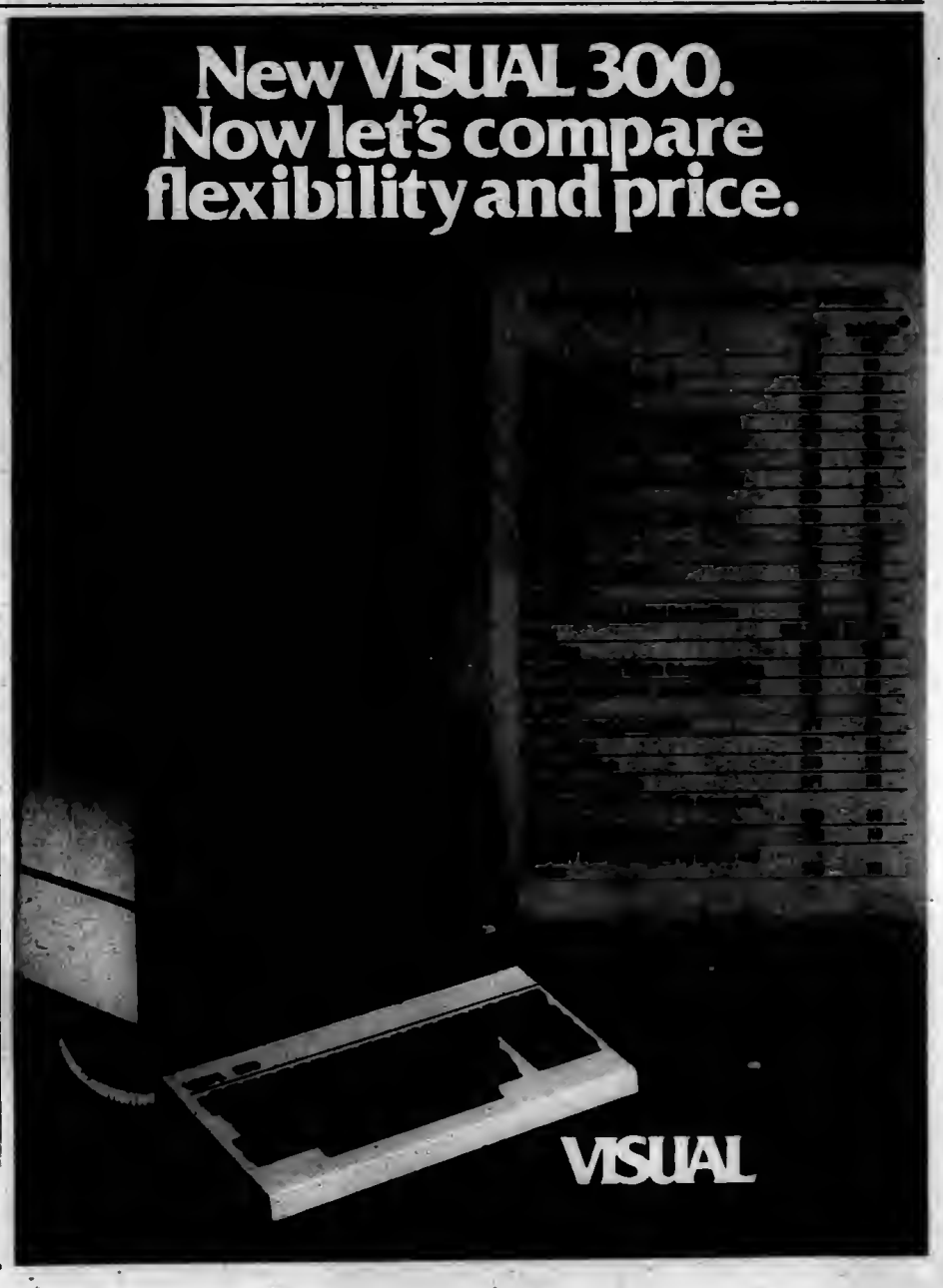
"We've been using COM-produced microfilm since 1974," systems manager Steve Stugan said. "In the early days, we used a COM service bureau, which satisfied our weekly and monthly needs. However, as demand for daily reports on microfiche increased, turnaround became a problem and it become more efficient for us to install our own COM.

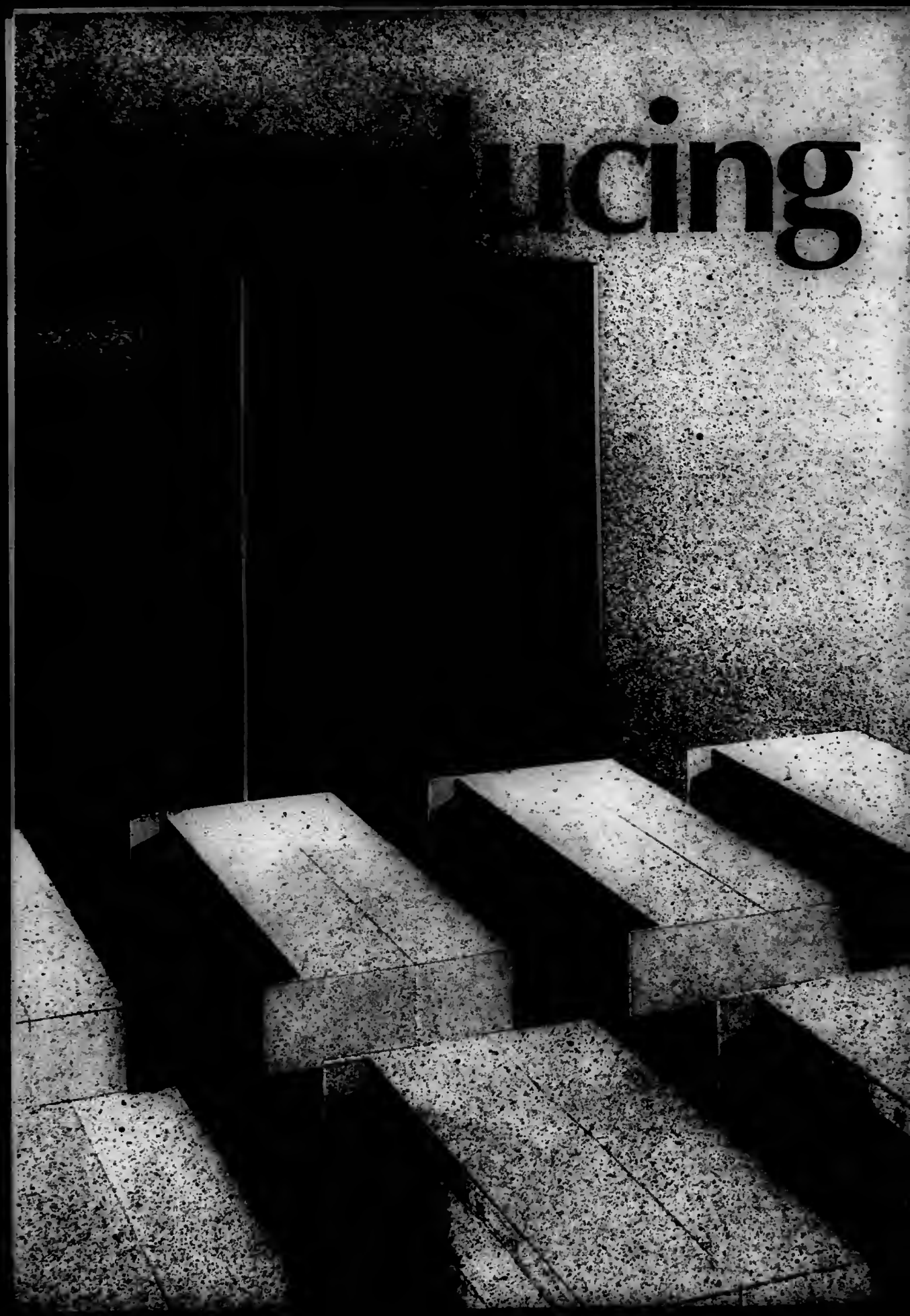
"Service bureaus are efficient when you generate a limited number of large reports and you are willing to live with courier service. We felt if COM was to replace our many daily 100 to 300 page reports, our users would expect the same service they were accustomed to getting with paper."

Prior to installing the in-house COM, the policy was to print everything on one-part computer paper — saving on paper costs and on operator time needed to change paper back and forth in the printers. The printouts would then be reduced to 8½-in. by 11-in. size and duplicated for distribution on a photocopying machine, Stugan said.

"Costs were skyrocketing on the duplicator. If we hadn't started using microfiche, we would be duplicating about 500,000 paper copies a month, and we really wanted to keep it down to about 150,000 to 200,000 copies a month. Duplication costs much less with microfiche than paper because we can duplicate up to 396 pages at a time on one microfiche

(Continued on SR/18)

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Industry-standard DASD architecture is proving inadequate for many high performance systems. The problem is the growing disparity between processor speed and disk response time.

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By alleviating path queuing problems, eliminating mechanical delay and driving transfers at full channel speeds, Sybercache reduces I/O times by as much as 75%.

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STORAGE TECHNOLOGY CORPORATION

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DP Group Operates Without a CPU 'in Site'

(Continued from SR/15)

for only about five cents in materials cost," Stugan said.

Since realizing the cost saving available through microfilm, a directive has come down from the president of the group that microfilm will be the standard instead of paper whenever possible.

While group DP still had its IBM 360 computer, Stafa installed a Kodak Corp. Komstar 200 microimage processor on-line to produce the microfiche. Stugan and he were appointed as a two-person task force to evaluate COM devices and recommend which devices to install.

"We looked at three or four machines in our evaluation," Stafa said, "and one overriding feature came through — the Komstar microimage processor is a dry process unit. We had no specialists in developing film, and we didn't want to build a room with plumbing. But most important was the fact that I didn't want chemicals in my machine room."

The laser COM uses a heat-developing film that requires no chemicals. Microfiche is processed integrally in a straight line. After exposure, the 105mm film goes directly to a heated drum for processing and is then cut to size automatically and delivered as completely finished frames. Duplication is done on the center's Kodak Ektafiche duplicator, which also uses heat-developing film.

Thus, even though the COM and the microfiche duplicator are both in the computer room, there are no chemicals and there is no need to remove the microfilm from the area to process it.

"Another reason we chose the Komstar microimage processor was it offered high-compression 59X reduction format," Stugan said. "With the 59X reduction, we can get 396 page images on a single microfiche.For many of our reports, that's one less fiche, and for the reader, it means handling one fiche instead of two."

Report Finds Mixed Bag

(Continued from SR/13)

Asked to list the top three distributed systems they would consider, respondents picked IBM's 4300 first (45 responses), followed by Microdata Corp.'s Reality (30), Mohawk Data Sciences Corp.'s distributed processor (17), IBM's 5100 (14), IBM's 3033 (11), DEC's PDP-11 (9) and Four Phase Computer Systems, Inc.'s distributed processors (9), the report said. There was a strong surge in users planning to make data communications part of their distributed systems. Ninety percent of the respondents said they have such plans while 71% said they planned on data communications in 1979.

Likewise, 85.3% of those polled said they are willing to mix vendors' hardware in their systems; 72.9% said they had such inclinations in 1979.

The data processing manager still holds power over DDP, according to 59.2% of 172 respondents; 22.1% said the director of information services would be in charge. The report noted that those figures are comparable with the 1979 report.

However, 14.5% of the 1981 sampling said management would be distributed among remote sites.

Out of 173 respondents, 90.2% said they now use centralized data bases; 33.6% of 152 respondents said they planned to install a distributed data base in the next five years, according to the report.

Office automation systems are becoming more popular in distributed systems. Of 144 responses, an office system linked to data processing equipment was preferred by 56.9%. Word processing systems linked to data processing equipment were preferred by 26.4%, and 15.3% preferred independent office systems.

The MIC report costs $25 and is available from the firm at 140 Barclay Center, Cherry Hill, N.J. 08034.

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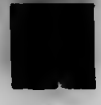

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Cut along dotted line and mail.

Data about former donors is accessible at a terminal. Here, Don Twyman, management information director for the Los Angeles-Orange County Red Cross Blood Center, checks the file while a blood donation is in progress.

DDP Keeps Blood Flowing For Red Cross Center; Cuts Processing Time

LOS ANGELES — In California's Los Angeles-Orange County area a distributed processing system is helping to keep the blood flowing for the more than 1,000 people per day who need transfusions.

The system, originally developed at the Southeast Michigan Red Cross Blood Center in Detroit, utilizes computers to manage its massive data-handling requirements while cutting vital information processing time et the blood center from five days — under the previous manual system — to one hour.

"The computer system is enabling us to balance our blood inventory — which ensures our having the right blood at the right times," according to Don Twyman, director of management information services for the Los Angeles-Orange County Red Cross Blood Center.

"Our tracking system augments our ability to utilize the collected blood before its shelf life expires. And our telephone linkup with the Detroit blood center enables us to share computer resources," Twyman said.

Blood is not only difficult to obtain, but its processing requires highly specialized equipment and procedures. Blood has stringent temperature requirements and an average shelf life of from 72 hours (for some cells) to 35 days, Twyman said.

To facilitate its handling, e blood center like the one here must maintain lists of eligible donors, ineligible donors, type and group of blood on hand, testing procedures and delivery — in this case, to 220 hospitals in e two-county area.

"In Detroit, we found ourselves running into major difficulties because we were farming out our files to a service bureau," Twyman said. "Turnaround time often ran to e full week. We realized that a change to an in-house computer system would enable us to interface some of our lab equipment with the computer and provide a data base management system that could help us deal in a timely manner with the various files that are vital to a blood center..

"We chose Hewlett-Packard Co.'s HP 3000 because the cost of the equipment was reasonable and site preparation minimal," Twyman said.

Transferring the software from Detroit to Los Angeles was easy, Twyman reported.

Initially the software was carried from Detroit to Los Angeles on tape. Program changes were then downloaded by cassette. Eventually, direct telephone downloading from one computer to the other will be possible between the two centers, Twyman said.

The HP 3000 Series III has 1.5M bytes of main memory configured with two magnetic tape drives, four 120M-byte disk drives and an HP 2619 1,000 line/min printer. There are 22 HP 2649B terminals located in data entry, donor resources (where lists are developed for blood drives and so forth), laboratories (where group and type checks are done, rare bloods are referenced and components are handled) and in the labeling and distribution area.

Linked to the Series III by a dedicated line is a Series 33 with .5M bytes of main memory, configured with one tape drive, three 120M-byte disks, two HP 2631 printers and 16 HP 2649B terminals. This computer

(Continued on SR/24)

COMPUTERWEEK

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STRATUS VS. TANDEM

(Or how the hardware non-stop solution has made the software non-stop solution obsolete.)

"If you drive down the cost of physical hardware, you can make typically redundant paths for less money. Not surprisingly, most redundancy breakthroughs that will occur happen in hardware rather than in software.

You can build a double computer inside one box for less dollars, as opposed to doing it in software, which continually needs maintenance and revision, as well as improvement."

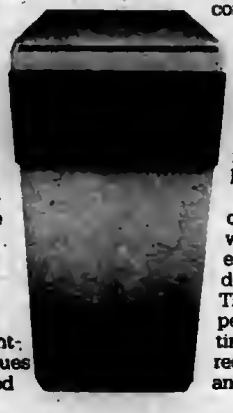
by Aaron Goldberg
of IDC which
appeared in COMPUTERWORLD's
December 28, 1981 issue.

	Tandem	Stratus
1. Does it require additional system design and additional software to implement non-stop processing?	Yes	No
2. Is there a trade-off between reliability and performance?	Yes	No
3. Can the system be repaired while it is processing by a non-technical person?	No	Yes
4. Can you add modules of processing power without stopping the system?	No	Yes

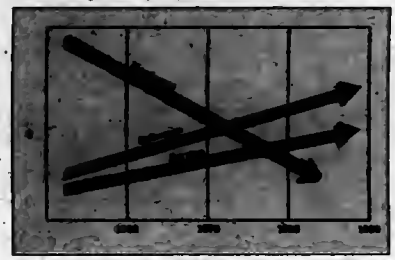
Now that the computer age is in full stride, 100% availability is fast changing from a luxury to e necessity. Downtime and its costs are unacceptable, especially when there is an alternative. Now that non-stop operation is becoming a universal requirement, there is demand for an improvement over the traditional approach. These computers must provide better performance, be easier to use, be easier to program and re-program, be less complicated and less expensive. We believe that the Stretus hardware based non-stop system answers these demands. Let us explain.

Why more hardware is better than more software.

The crux of the problem with Tandem's software based system is that it requires complex, performance stealing software to provide non-stop operation. This software robs the system of precious resources because it uses processing cycles to pass status and checkpoint informetion back and forth between two computers. What's more, this passing of information must occur at four levels: operating system, user program, file management, and terminal control.



Stratus, meanwhile, has eliminated all this reliability software by having duplicate hardware components tightly coupled, dedicated to performing the same tasks at the same time. It's like having two computers in one, rather than two separate computers. Checking hardware logic detects errors with no performance loss and stops failing components instantly. The duplicate partner continues without interruption, unaffected by the failure. This is all transparent to the programmer and the user. With Stratus, there is no performance or data loss when there is e failure, no operator intervention, and no special programming.



While software costs will rise because they are people dependent, experts agree that hardware costs will continue to fall

Why Stratus is easier to implement than Tandem.

The Stretus designer and programmer might as well be dealing with a conventional computer; one of them, not two. Programmers are in a familiar environment. By providing industry standard languages, applications can be moved over without redesign or major reprogramming. Non-stop operation is a bonus, not a complex effort.

With Tandem the system designer and programmer is working with two computers. (An environment unfamiliar to most designers and programmers.) This approach requires more experienced personnel, takes more time for application development, requires continual maintenance, and as a result is more costly.

Hardware costs less.

The Stratus concept could not have been executed 10 years ago, 5 years ago, or even 2 years ago. It certainly couldn't have been done in 1974 when Tandem started developing its system. It is possible now because of the dramatic price drop of hardware components. Because of this lower cost of hardware, and because of the simplicity of its architecture, Stratus can offer continuous processing at a price competitive with traditional systems that don't offer non-stop processing. Compared with Tandem, Stratus is about $100,000 less expensive for comparable entry level configurations, and the difference gets larger with bigger systems.

Don't overlook our software.

Despite what might seem to be a total emphasis on hardware, the fact of the matter is that we spent more development money on software than on hardware. Briefly, here's our software list: Virtual Operating System (VOS), Data Management System, CRT oriented command languege, Cobol, Basic, PL/I, Networking using X.25, IBM Communications, full-screen editor, symbolic debugger, and a complete Word Processing package.

If your application requires total reliability, if you are considering any kind of dual-processor configuration or if you're considering Tandem, then you should fill out our coupon or call Nick Bologna, Director of Product Marketing, 617/653-1466.

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'Sodas' System Helps Beverage Distributor

Special to CW

COLUMBUS, Ohio — "We will need a flexible computer network if we're going to continue our rapid growth rate."

Bob Ball, director of management information services for Beverage Management, Inc. (BMI), a beverage producer and distributor based here, made that prediction three years ago.

And he was right. BMI's continuing product and geographic distribution had outstripped the capacity of its centralized computer setup. To manage its widespread operations more effectively, BMI is presently creating a data processing network with a Honeywell, Inc. Level 64 computer installed at corporate headquarters as the host. The company is now linking it to Honeywell Level 6 small systems at each of its eight bottling plants in three states.

"When this network is completed, we'll be able to cut administrative costs while building a distributed financial, production and marketing reporting system for each bottling plant," Ball said.

At the moment sales and expense figures for approximately 700 drivers and salesmen for about 75 products and package sizes are entered and processed by the free-standing Level 6 systems and used to generate daily warehouse reports. This data will eventually be batched via communications terminals into a data base at the headquarters' computer for consolidated analysis and reporting.

The Level 64's data base will enable BMI to assess profitability by several criteria such as product, size and approximately 40,000 soft drink cus-

DDP Keeps Blood Flowing for Red Cross

(Continued from SR/22)

handles the same functions as the Series III, plus accounting procedures and provides a backup in the event the Series III goes down, Twyman said.

Additionally, four Printronix, Inc. printers are linked to the Series III with four wands, two at the labeling stations and two in the distribution area.

According to Twyman, the HP DS/3000 links the two CPUs in Los Angeles with the HP 3000 Series III and Series II computers in the Detroit system. In each location the two units are linked together by dedicated line, allowing authorized personnel to utilize information from the data bases in Detroit or Los Angeles from any terminal hooked into the system on either end.

Data Bases Significant

Data bases provide the key to the blood center's operation. First, a donor file data base is available consisting of 600,000 names along with demographic information and donation histories. A blood alert file contains 230,000 names indicating blood that cannot be accepted because of a history of blood-transmitted diseases such as hepatitis.

Also, a rare blood file lists 20,000 donors whose blood has been found to contain certain rare red cell factors. There is a file of 8,000 local groups who encourage blood drives. A work-in-process file tracks lab work, while the distribution inventory file lists blood products on hand ready for dissemination to hospitals. A hospital file performs billing functions and plays a role in the center's blood tracking system, Twyman said.

All data bases are on-line and managed by the HP Image data base management system, Twyman said.

HP's Query, a program for ad hoc access of the data bases, is also used. If only partial information is available on a particular donor, the program accesses the data base using that information in order to obtain the complete file on that donor. Query is also used for statistical reports, enabling the center to determine what its donor activity and product demand will be during a given period, Twyman added.

Although Red Cross blood donors are volunteers, an extensive donor contact program is required to maintain sufficient inventories. In some cases the donor file is accessed and persons with specific blood types may be contacted. Mailgram-style messages are automatically printed out by the computer system.

The telephone linkup between the Red Cross blood centers in Los Angeles and Detroit enables the sharing of blood resources. In addition to faster response time to local blood crises, these two centers can now transmit special blood needs from computer to computer.

Very small terminals for IBM users.

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tomers (accounts). In addition, BMI will be able to evaluate the distribution of products by geographic market segments.

"These data analysis capabilities will enable us to adjust our business strategies quickly to meet changing customer needs, delivery truck routing and production quotas," Ball explained.

A typical Level 6 configuration consists of a Model 43 central processor with 192K words of main memory, a 300 line/min printer, 13M bytes of both fixed and removable disk, four Honeywell visual display terminals, one synchronous communications line and one dial-up 4,800 bit/sec modem. The host Level 64 has 512K bytes of main memory, three nine-track tape drives, s 900 line/min printer, a 300 char./min card reader and five 100M-byte disk drives.

To identify the kind of software needed to tie the network together, Ball visited several other soft-drink bottlers with installed computer systems and also talked to software development houses that offered "soft drink packages."

'Sodas' Software

"None of the systems we evaluated met our particular needs, so we developed our own software system for the Level 6s called Sales-Oriented Display and Settlement [Sodas]. It now is working at our Cincinnati and Dayton plants and will be installed next at our Cleveland facility followed by the remaining plants by year's end," Ball said.

Sodas contains comprehensive management information about BMI's sales and distribution functions. The system's data base, maintained by each plant's Level 6 small computer, is capable of supporting multiple profit centers and warehouse sites and keeps track of wholesale, promotional, special and satellite sales activities. Sodas is flexible enough to accommodate BMI's diverse product line as well as volume data generated from telephone, presale, driver, distributor and plant sales efforts, Ball pointed out.

The interactive software is fully menu driven and performs a variety of functions. For instance, it updates BMI's sales history data base in addition to warehouse, employee, product and general ledger master files. After data entry, the validation and processing of all sales ticket information is done automatically.

In addition, Sodas monitors truck load-out and load-in quantities as well as driver cash/expense/adjustment activity, Ball said.

When necessary, data correction is accomplished in a real-time environment, which enables the system's status display function to search for all invoice errors for correction.

"We then can print s hard-copy output which pulls together all driver data for final balancing. In addition to sales history updating, Sodas transmits data from the plants to our host Level 64 for corporate-level management reports," Ball noted.

The Level 6s prepare local management reports that contain daily, week-to-date, month-to-date and year-to-date figures for more accurate sales analysis and efficient response to various business demands.

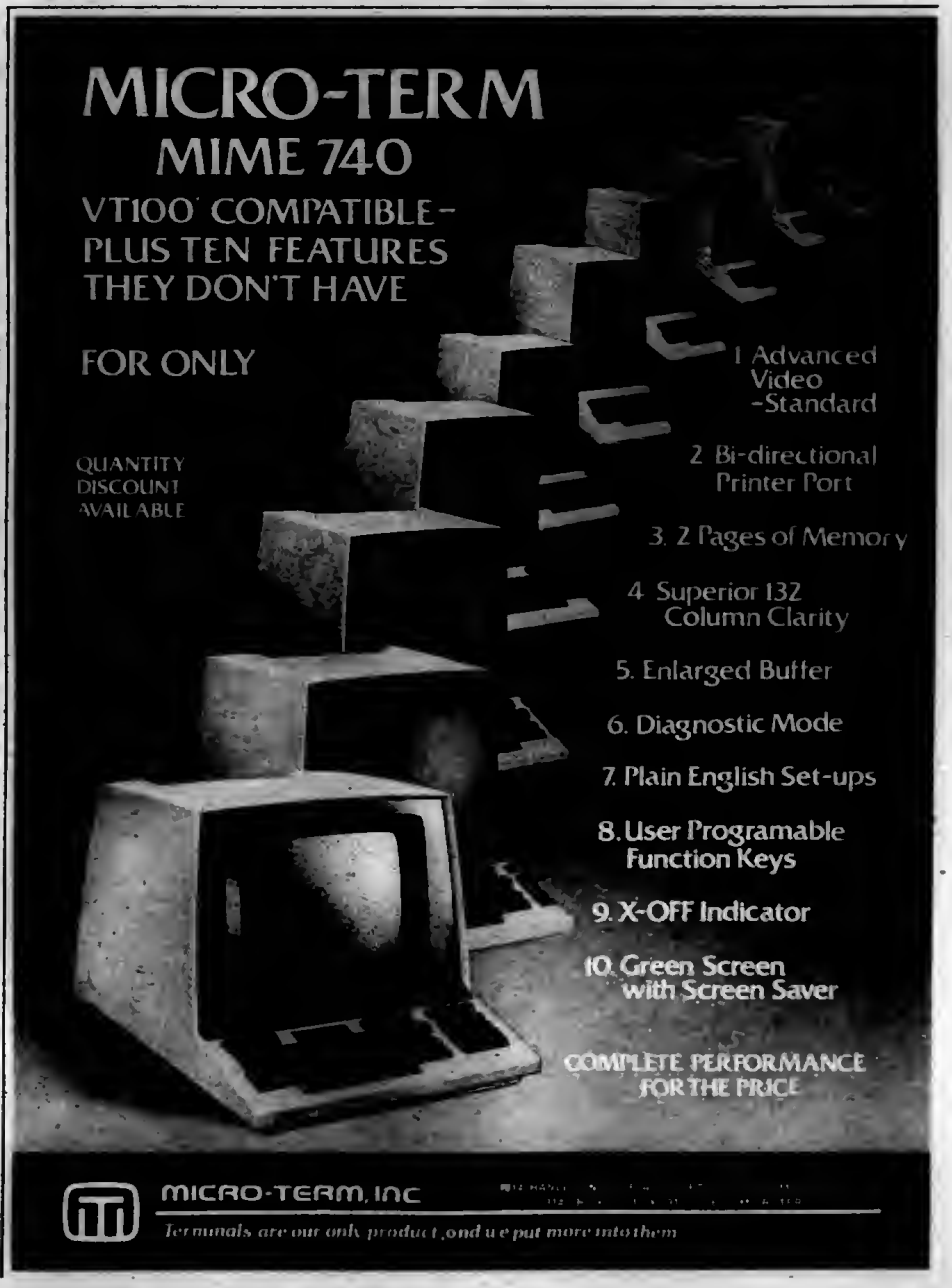
These sales reports contain both unit and dollar information for each product and package size for each warehouse. In addition, the reports track all wholesale, promotional, special and satellite sales performance, compare projected sales to actual sales and recap all data for consolidated warehouse reporting.

BMI has grown as s bottler and distributor of soft drink products throughout Ohio and in parts of Michigan and Pennsylvania. A subsidiary, Perfecto Distributing Co., markets a variety of domestic and imported wines and beers to outlets in central Ohio. The firm also is active in the sale and leasing of beverage vending equipment and as a food concessionaire at sporting events. In addition, it owns an advertising agency, Trend & Associates, which creates marketing campaigns and buys media exposure for BMI products.

In 1978 the company entered the processed and spring water business by acquiring the production and distribution rights for Polar Wster and Crystal Wster in parts of Pennsylvania, West Virginia, Maryland, Washington, D.C., and Florida.

Finally, when BMI added distribution rights in parts of Ohio, Michigan, Kentucky and West Virginia for Perrier mineral water in 1979, it had achieved its goals of industry and geographic diversification and continued plans for installing s distributed data processing network to keep up with its growth.

"The system will allow us to integrate such other application modules as accounts receivable, production planning, warehouse inventory control, distribution analysis and modeling," Ball pointed out.



Firms Reap DDP Benefits — Without Hardware

ST. LOUIS — Not all distributed processing can be measured by hardware scattered in remote locations. For at least two firms, there isn't any hardware at all. The companies use distributed software offered by a computer services vendor.

Chicago-based Faber Enterprises, for example, is using general ledger, accounts payable and payroll modules to process accounting transactions at 80 facilities.

And Gallagher Bassett Insurance Services, a national administrator of self-insurance plans, is using a group claims reporting system (GCRS) to manage the firm's employee benefits administration division.

Both firms are using services provided by McDonnell Douglas Automation Co. (McAuto); however, other computer services firms offer similar programs.

A subsidiary of the Greyhound Corp., Faber has been using McAuto's Autocountant, an integrated job processing service for the distributed user. It includes seven modules: accounts receivable, accounts payable, fixed asset accounting, inventory, personnel and payroll.

Faber has more than 80 facilities, including restaurants, bars, retail gift and merchandise shops and drugstores. They are located primarily in large Chicago office buildings and hotels. (For example, all the public restaurants and bars in the Sears Tower and most of the shops and restaurants in Union Station are Faber's.)

By using the general ledger module Faber has reportedly saved three days in producing its financial reports.

The accounts payable module has given Faber a 50% faster turnaround in generating cash distribution reports. And the payroll module has sped Faber's edit report production time by 30%.

Errors Reduced

In addition, Autocountant has helped Faber reduce its margin of error. Faber's payroll operation — with a check distribution of close to 2,000 a week — was a primary target for accounting errors under the old local service bureau system, Bill Stalls, the firm's vice-president, said.

"Because all of our payroll procedures were controlled by someone on the outside in the past, we were never aware of the errors until the checks had already been passed out," Stalls said. "With Autocountant, we have the ability to write, process and sign the checks in-house, which has substan-

(Continued on SR/32)

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Cuts Registration Time

DDP Net Leaves Students Time for Relaxing

Special to CW

TALLAHASSEE, Fla. — Summer here is s time for fun and lounging on the beach, not standing around in long lines. The Florida State College System is trying to help its students do just that. The system installed s distributed processing network to help with student registration.

IBM 8100 processors on campus, tied into a statewide communications network, provide on-site data handling capabilities for registration while making available the services of the state's central computer facilities.

The system, developed by the state university's management information systems (MIS) office in Tallahassee, is in use st four campuses. Joseph P. McGuire, project manager for academic software development, said, "The average key-in and response time for an operator is 17 seconds per student. The entire registration process takes only three or four minutes."

During this time, the system builds individual student records, uncovers schedule conflicts, keeps count of the number of students enrolling in classes and closes classes that have reached the fill-up point. When the student's requirements have been met and a class schedule has been created, the schedule and a bili for tuition are printed on s machine close by, McGuire said.

Improves Student Services

"It's amazing what this has done to improve student services and relieve the headaches of college presidents and administrators. Signing up for classes was stressful for students and staff alike, particularly where 'bull pen' methods were used. Students knew the classes they wanted, but they seldom could find out at the moment if the classes were filled. The only thing to do was to sign up and hope there would be places for them," McGuire said.

"Compounding the situation were computer service disruptions that would result in long student lines, canceled registration days and disgruntled faculty and administrators. While any on-line system involves certain risks, our objective was to minimize them by stabilizing the environment with on-site hardware and software.

"Now, with constantly updated student and class schedule files that respond quickly to requests entered on on-line terminals, the student knows immediately where he stands. And when he finishes the registration process and receives his printed schedule and bill, he knows he won't have to come back," McGuire said.

Walter Smith, president of Florida A&M University in Tallahassee, one of the system's users, said, "This has been one of the best things in years for student morale."

The procedure begins with preparation of student and class schedule files for transmission or downloading from host computers in regional data centers to on-site IBM 8100 processors. These processors communicate with the host a second time when the files, updated with new information, are transmitted back to the central processor.

A single data transfer can handle registration for the entire term, but the user has the option of sending updates to the central files daily. Since unique characteristics for each institution in the state university system must be accommodated, each user determines how registration will be conducted for a given cycle, Smith said.

Input for registration and add/drop transactions consists of a continuous string of numbers and letters that identify the student courses to be added or dropped, course options and codes covering permission to add classes, overrides and the sum of credit hours.

Once data is entered, it is scanned for errors. Then the system checks to determine if the student is on file and if any academic or administrative holds are in effect. If irregularities are noted, a message appears on the terminal screen and corrections are made. If no errors are noted, processing begins, Smith noted.

Course Changes

All dropped courses are applied to the student's record in the first pass and the operator is notified of any unmatched drop transactions. Input courses are again scanned for add transactions, which are processed in sequence. Then, the student's courses are scanned to ensure that all linked course requirements have been met.

(Continued on SR/30)

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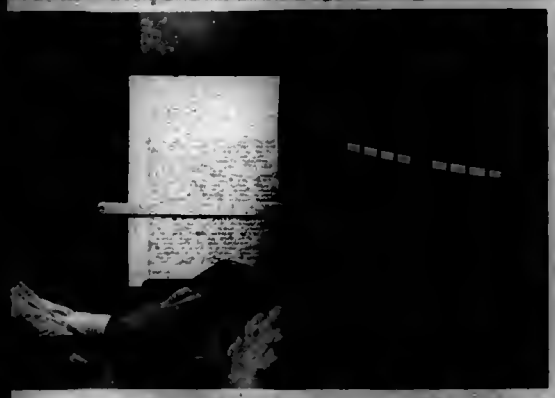

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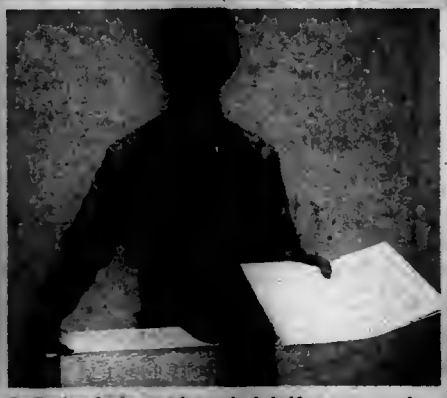

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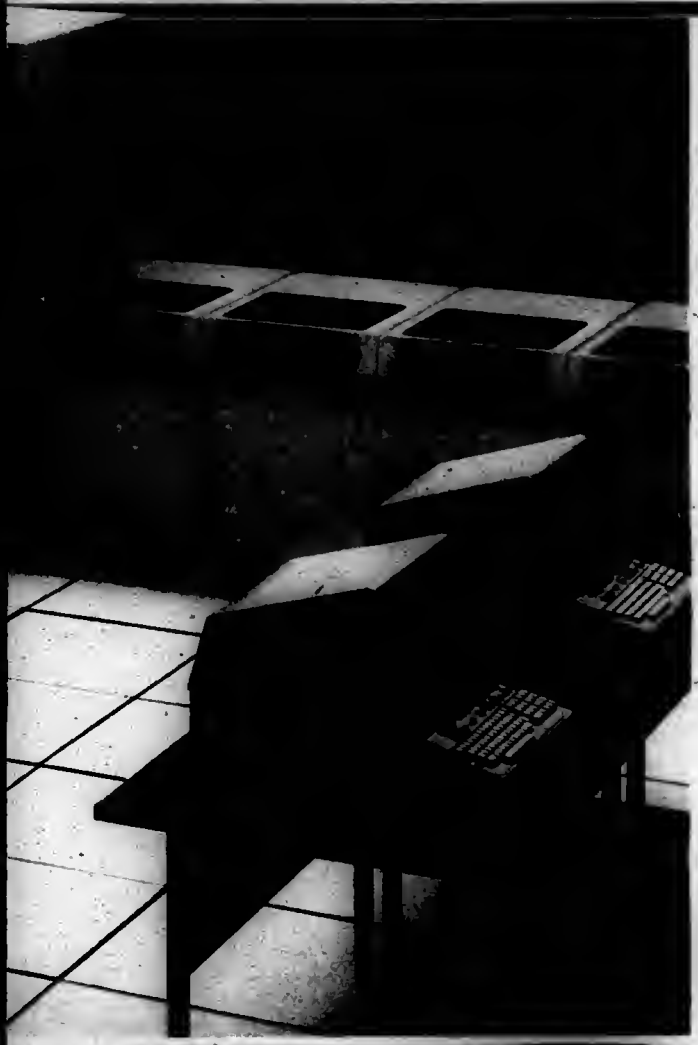

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47204

DDP Net Leaves Students Time for Lounging

(Continued from SR/27)

Next, the registration load is compared to input and if there are differences, processing ends and the operator is notified. If necessary, the registration load is checked against a predefined maximum to determine if an overload situation exists. When this occurs, the terminal operator is prompted for a response to either continue or terminate processing, Smith said.

At this point, input data (adds and drops) is scanned and the class schedule is accessed for all transactions processed in the first phase of registration. Enrollment counts are adjusted accordingly, based on the transaction type.

When a closed section is encountered and partial schedules are not allowed, an error mode is established for the course and the effect of previously processed transactions is voided. If partials are allowed, the course is "errored" but processing continues. In cases where a section closes out during processing, a notification is printed and subsequently posted in the registration area. A printed confirmation is prepared and information is stored in a log file when registration is completed, according to Smith.

Several terminal screen displays assist registration personnel. The first is a menu that lists system modules available and describes functions performed, helping the terminal user step through procedures. Upon entry of a course reference number taken from the list, the terminal displays the course identifier, title, location, enrollment, seats available and status (canceled, closed or open).

One institution has a terminal set up in the registration area so students may check the status of courses before attempting to register, McGuire noted.

Section listings may also be displayed according to several different criteria. These criteria can be sections closed, canceled, open or held; college, department, prefix and/or course number; and by reference number range and campus. These screens (or printouts, if desired) show the full course identifier, title, credit, meeting times, location and enrollment date.

Monitoring Enrollment

By using the display option and selection criteria of open sections and some combination of college, department, prefix and number selection, students receive help in course selection during registration or during add/drop periods when many sections are closed. Administrators use the display to monitor enrollment data in selected sections. Another important product of the system is a printed report of closed sections, McGuire said.

A registration display includes student demographic and course information. Dropped courses are retained and displayed with a "course dropped" and date notation. Advisors use the display for counseling during add/drop and cashiers use it to verify credit loads and registration status.

Statistical data is created each time a student attempts to register, add or drop a course. Such information includes the number of attempted and successful registrations, numbers of add/drop attempts and completions and current enrollment counts, McGuire said.

These on-line registration procedures are in place at the University of Florida in Gainsville, Florida International University in Miami, Florida A&M in Tallahassee and the University of Central Florida in Orlando.

"User institutions," Earl Kellow, associate director of management information systems, said, "are enjoying the benefits of mainframe computer power without having extensive hardware installations. And the smaller on-site computer systems are operated easily by staff members who aren't necessarily data processing experts."

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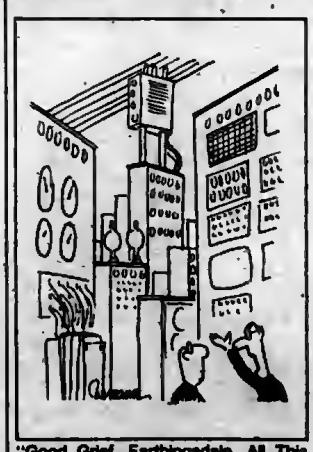


"Good Grief, Farthingadale, All This and You Forget How to Turn It On?"

PRINTER REPORT PRINTER REPORT

Dual Purpose Matrix Drops Below $2000

High speed report printing

Correspondence printing

Mannesmann Tally has broken the $2,000 price barrier for full-size dual purpose matrix printers. The model MT-1800, introduced at the '81 NCC, alternates between correspondence quality printing using a 40 x 18 dot array and high speed data processing printing using a 7 x 9 dot array. It is now priced at $1995. The MT-1800 fulfills the same functions as a business system configured with both a daisy wheel printer and faster matrix printer, but at *half* the price.

Additionally, price reductions of over 15% were announced on the popular MT-1600 and MT-1700 serial printers. The MT-1700 standard configuration machine is reduced from $1995 to $1695. The MT-1600 options adaptable unit is reduced from $2095 to $1695.

Recent developments in high resolution matrix printing are finding rapid market acceptance. Marvin Crumb, president of Mannesmann Tally, reported that his company is experiencing a pronounced shift to its dual purpose (200 cps/50 cps) printer among its dealers. He also noted that: "OEM's too, are responding to the pressure to bring down the price of small business systems by selecting our new, more versatile matrix printers."

"Reliability, however, remains of paramount concern as the cost of providing maintenance continues to escalate. Fortunately, reliability has consistently been our forte. IBM's introduction of the 4540 matrix printer, employing this same concept, underscores the move to matrix."

On-going investment keeps mature product at forefront of technology

Even while Mannesmann Tally is reducing prices, new design enhancements are being added to the MT-1000 family of serial printers. Printer speed has been jumped from 160 cps to 200 characters per second. Buffer size is increased to 2000 characters for reduced system overhead and to handle full CRT screen dumps. The units contain seven different resident international character sets. The MT-1600 and MT-1700 can be upgraded in the field to a dual purpose MT-1800 correspondence quality printer. The 1000 series was the matrix printer family that initially introduced microprocessor technology to a printer peripheral and used a cartridge ribbon. Since then the printer has been completely overhauled with new mechanism, Mannesmann print head and electronics featuring an interchangeable modular I/O. Extensive new programming has added compressed print, vertical and horizontal tabbing, a correspondence quality matrix, I/O parameter selection, and data throughput optimization.

Unique features for special needs

For applications versatility, Mannesmann Tally offers exclusive features that extend the capability of its printers. For example, two color red and black printing allows the user to highlight text, differentiate interactive messages or signal accounting figures such as debits. To allow immediate access to a form once printed, a Quick Tear assembly lets the user remove a completed form immediately after printing without wasting the following form. The Quick Tear increases productivity and significantly cuts the expense of forms usage.

Another forms handling aid available is an Automatic Front Feed attachment that accommodates pre-cut individual forms. The unit, under program control, inserts the form, positions it for printing, and ejects it upon completion.

Gruelling road test reveals reliability

Certification tests on Mannesmann Tally 300 line per minute matrix line printers running at 100% duty cycle revealed a reliability record of under one failure per year per printer based on normal usage. The tests were conducted on six production models over a six month period to represent 2.5 years of normal usage per printer. Projected test results indicated only 2.3 random component failures per machine within that 2.5 year period.

In addition to the above reliability results, the T-3000 line printer never requires preventive maintenance, never needs adjustments of any type. When a failure occurs, the unit features a *diagnostic status display* that tells if the fault is operator correctable or requires a service call. If the latter, the display tells the service man the problem for a quick and inexpensive remedy.

From an applications standpoint, the T-3000 offers a versatile multi-font option that includes host defined fonts, high resolution characters and double high characters. The user can define and store his own character sets to print business graphics, special characters, multiple languages, labels and forms. Symbols can be changed "on the fly" under host control without operator intervention. Another valuable aid is the dynamic vertical vernier adjustment that allows the operator to "fine-tune" character placement on the form while the machine is printing.

300 Line Per Minute Line Printer

Mannesmann Tally to challenge DEC LA-120

The 1200 Baud MT-1612 teleprinter is now available with ANSI standard control codes for compatibility on DEC networks. Also, list price has been reduced to $2295, print speed has been increased to 200 cps and a nine-needle print head has become standard for printing true descenders and underlines.

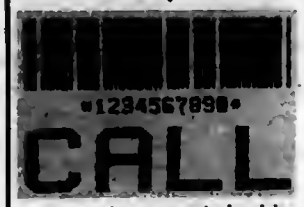
A user can now run the MT-1612 and the LA-120 side by side in an on-line network without software modifications. Since both teleprinters are programmable, definable functions will respond to the same instruction set. Control functions can be programmed from the keyboard or loaded through the host program.

The Mannesmann Tally teleprinter, priced below DEC, offers numerous features and options not available with the LA-120. The MT-1612 is a tabletop unit that operates at a quiet 58.5 dbA noise level. It has an optional two color red and black print capability and special forms handling attachments.

MT-1612 Teleprinter

For customer convenience, the Tally product employs a cartridge ribbon system, needs no preventive maintenance, offers an operator replaceable print head and has a HushTone kit for extremely quiet (53 dbA) environmental requirements.

Bar Code, OCR *with matrix printers*



Recent advances to print head design and microprocessor based logic have made matrix printers a highly cost effective solution for producing bar code symbols, OCR characters and solid mass label characters.

With the ability to place the dot anywhere on a page, matrix printers are capable of generating sharp, machine readable characters at high speed at a fraction of the investment cost of dedicated printers.

Mannesmann Tally manufactures printers that are designed to economically print bar code, OCR and regular text. The machines can be equipped with the necessary forms handling to efficiently handle labels, special stock or special sizes. The TrimForm printer, which supports bar code & OCR, features an integral cutting device that automatically snips a continuous form off to the length specified by the host.

MANNESMANN TALLY

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Firms Reap DDP Benefits Without Hardware

(Continued from SR/26)

tially reduced the number of errors."

To keep pace with growing business and transaction volumes, Faber is upgrading its Four-Phase Systems, Inc. Model 60 minicomputer. Other equipment includes five CRT terminals, disk storage and a 300 line/min printer.

The company is also adding sales reporting, a module tailored specially for Faber. It was designed to produce monthly sales and cash receipts reports by facility. This data is then automatically posted to the general ledger for financial reporting, Stalls said.

At Gallagher Bassett, GCRS was installed in September 1981. "Our goals were to improve our timeliness and accuracy and, at the same time, increase efficiency by developing a system which would maximize the strengths of our technical staff through the automation of routine clerical tasks," according to Bob Strom, vice-president of field operations.

"The results exceed our original goals. Since the installation of GCRS, our ability to serve our clients has increased dramatically. In addition, GCRS has provided the incentive for our sales staff to exceed its plans by a wide margin.

"Not only does GCRS pay claims, it maintains eligibility, prints monthly invoices and produces instantaneous daily and month-end financial summaries," Strom said. "This greatly enhances our clients' ability to better manage all aspects of their benefit plans."

The distributed data processing technique uses a minicomputer in the customer's claims office linked to a mainframe in McAuto's teleprocessing network.

The minicomputer, which can be leased directly from McAuto, controls the CRT terminals, line printer and local storage, providing complete control over all claims functions, Strom said.

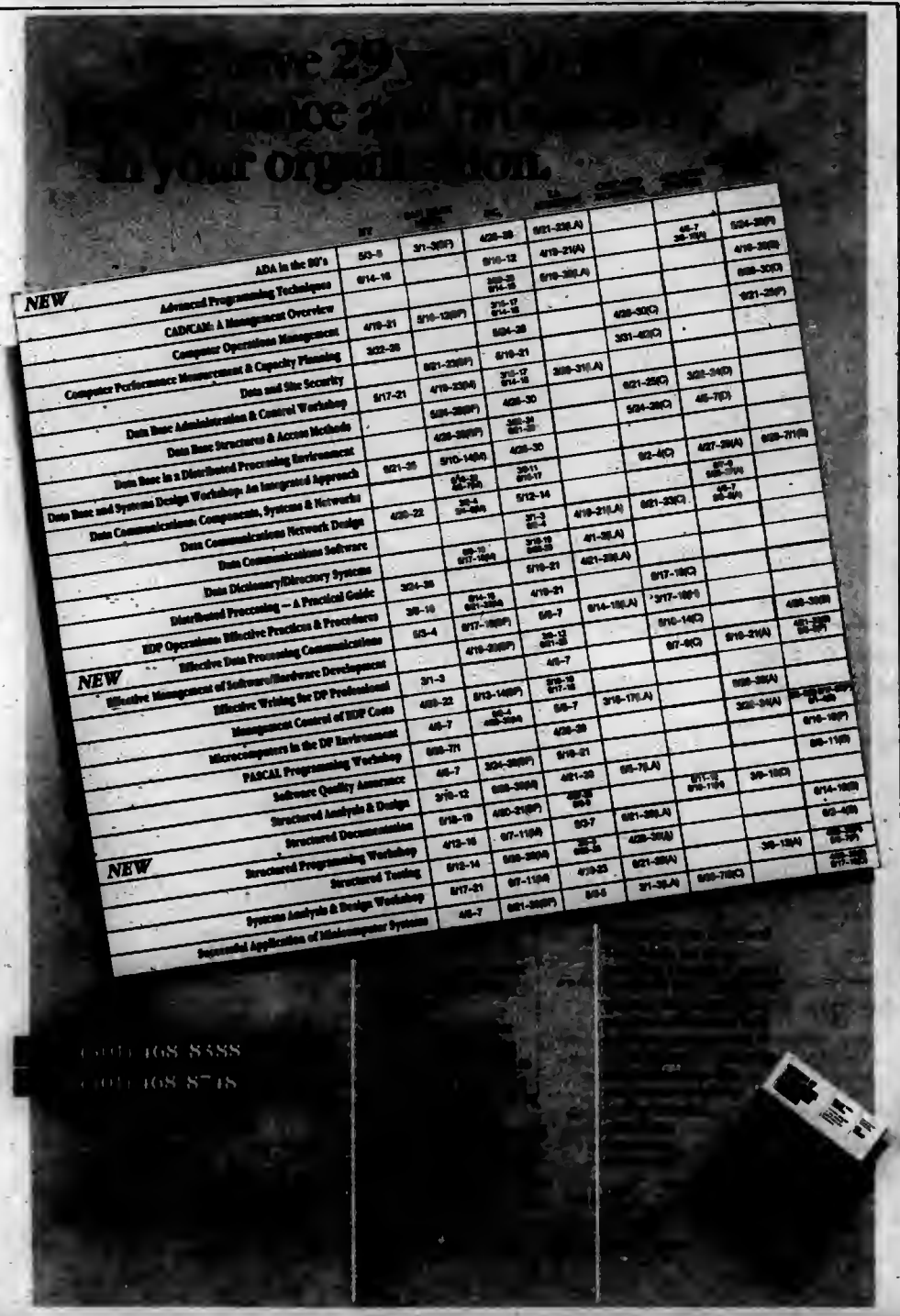
Instant Access

In this real-time environment, information is instantly available for screen editing and daily processing before transmission to McAuto for batch report processing. Following processing, reports are printed in the customer's claims office, Strom explained.

The remote terminal capability of the minicomputer makes possible immediate on-line consultation with McAuto insurance analysts and communications specialists.

Using 16 terminals, Gallagher Bassett's Chicago office has increased the number of claims processed per month to 8,000, up from 6,400 under the manual system, according to Strom.

"Before GCRS our monthly reports were released 35 days after the close of business for the claim month," Strom said. "Now, with GCRS, our reports are ready by the third working day of the month."



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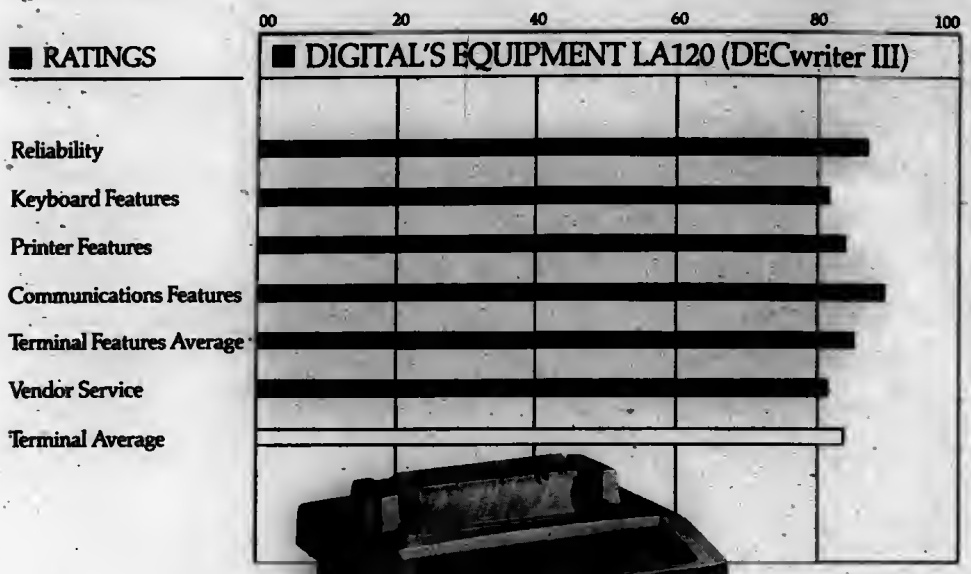

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Encompasses Range of Concepts

For Top Firms, DDP Means Mix of Capabilities

By John P. Schultz
Special to CW‡

Distributed data processing (DDP) is a concept that is practically everything to everyone. It encompasses concepts ranging from desktop microcomputers to networks of multimillions of instructions per second mainframes.

To many leading-edge companies, however, DDP has come to embody a combination of capabilities that go beyond the concepts of the operational systems of the last 25 years, such as order entry, inventory control or the financial family of general ledger, accounts payable, accounts receivable and payroll.

'Truly' MIS

In many cases, leading-edge distributed processing systems are truly management information systems. Their goal is to place a wide variety of information directly into the hands of the professionals who manage an enterprise.

These systems are used as powerful replacements for the calculators and telephones of yesterday. This information is then used to improve the productivity of the individuals and the competitiveness of the companies involved.

However, the users of these systems are not DP professionals, and the systems are intended to be used without the assistance of the DP department.

Variety of Names

These DDP systems are known by a variety of names, such as office information systems, decision-support systems or information centers. The capabilities of these systems typically include the following:

- On-line availability of traditional programming languages for use by management professionals, particularly Basic, Fortran and APL.
- Word processing capabilities that can be used for the creation of large reports, business letters or interoffice memoranda. (These capabilities are aimed at the professional who feels more comfortable with a terminal than with a pen or dictating machine. A graphics capability is frequently desired to augment the word processing to allow the inclusion of charts, graphs and diagrams along with text.)
- Electronic mail capabilities that allow documents and other material to be distributed locally or throughout the world. Remote distribution is not limited to data communications, but often includes interfaces to telex/TWX carriers.
- A high-level data base management capability. These systems provide nonprocedural interfaces that allow the user to specify what is wanted rather than how to get it. In many cases, their logical and calculational facilities exceed those of programming languages and are vastly easier to learn and use by noncomputer professionals.

Included along with this capability is the ability to extract data from the operational systems that exist throughout the enterprise.

- Statistical analysis tools that can be used in conjunction with the high-level data base.
- And finally, access to other information sources such as commercially available data bases like the *New York Times* Information Service.

All of these capabilities must be available to the pro-

(Continued on SR/38)

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DDP: A Mix of Capabilities for Top Firms

(Continued from SR/35)

fessional from a single terminal that can be located in his office. It is desirable that this terminal has a large screen display that is capable of word processing and graphics and possibly color, in addition to traditional DP applications. Color graphics is yet a further refinement.

It is important that the software interfaces to these diverse capabilities be consistent, intuitively obvious and transparent of internals. This minimizes user training and allows the users to quickly feel comfortable with the system.

These systems were designed for on-line interactive usage. Generally, they are operated by a menu structure, special terminal keys/functions or a combination of both. Consistency means that the same procedures should apply throughout the system; therefore, programming languages should not be menu driven while the data base management system (DBMS) uses special terminal keys.

Self-Training Possible

If the user interfaces are intuitively obvious after a few hours of training, users should be able to teach the remainder of the system to themselves. On-line help capabilities are useful in reducing the need to refer to technical manuals.

It is important that systems internals be as transparent as possible; a requirement to learn physical device names or to specify file formats and I/O blocking factors increases the need for special training. The internals of many of today's general-purpose computer systems get in the way of the actual functions they are trying to accomplish.

From a hardware standpoint the system must operate in an office environment without special air conditioning and must be extremely reliable. Considerable CPU power is required to efficiently execute many of the capabilities listed above, such as APL and the high-level DBMS.

This is where the increased power of the 32-bit minicomputers may be necessary. In fact, the trend is toward dedicated single-user systems to ensure consistent response times. This CPU power must be coupled with sufficient real memory to allow large software systems to execute efficiently. The exact amount of memory is a function of the hardware and software architectures, but is probably measured in megabytes.

Access Required

These DDP systems require access to large amounts of on-line storage. This storage can be directly attached or can be accessible through a high-speed local communications network. Local communications is required for electronic mail and file transfers between located systems. Remote communications is also required for electronic mail and for access to operational data bases. The ability to function as part of a remote communications network is obviously desirable to reduce the expense of direct links.

Secretaries can use these systems as replacements for dedicated word processing equipment with the added advantage that the professionals they support also have direct access to the resulting documents. Technicians can use them to prepare large reports, possibly by pulling pieces from other documents that have been generated with the system.

Electronic Mail Capabilities

Finally, personnel at all levels use them to review their electronic mail and to forward correspondence to others in the organization. The electronic mail capabilities reduce the inefficiencies caused by the games of "telephone tag" that frequently occur today.

How are the leading-edge companies obtaining the capabilities that are part of these advanced distributed management information systems?

In many situations they have evolved to the level of capability described in this article. The history of IBM's Professional Office System in conjunction with VM/370 is certainly an example of this evolution. In other cases, users are going the request for proposal route and requesting integrated hardware/software proposals that provide these capabilities.

Finally, some companies are assembling these systems themselves. For instance, all of the capabilities listed exist as separate products for the VM/370 environment. What is required is to select the hardware and to install and integrate the software packages. While this task is not that simple, it certainly is easier than developing all of the capabilities from scratch. What is certain, however, is the growing demand for systems with true management information capabilities.

Schultz is vice-president of engineering at Formation, Inc.

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Switches From Centralized Approach

DDP Gets Glowing Reviews at Power Plant

Special to CW

CHICAGO — The way Frank Blake Jr., Commonwealth Edison Co.'a computer activities director, sees it, his firm had three good reasons for awitching from a centralized computer system to a distributed processing network.

• The technical directors and management at each of the firm'a 15 power generating atations wanted to do their own local processing.

• The two IBM host computers at the firm'a headquarters were already working to capacity and would be atrained even more when six additional nuclear reactor stations came on board in the next five years.

• Because of the regulations governing power plant operations the firm not only wanted a better handle on corporate information, but needed more of that information in a more timely manner.

In 1960 Commonwealth Edison opened the nation's first privately financed nuclear power station Since then it has opened two other stations, one in 1972 and one in 1973. Six more units are currently under construction. Almost half of its electricity production today is nuclear-fueled.

The utility delivered over 61 billion kilowatt hours of electricity last year to an 11,525 square-mile service area of northern Illinois.

SNA Installed

To keep up with demand, the firm recently installed IBM'a Systems Network Architecture (SNA) on its two 3033 mainframe computers to communicate with minicomputers located at each of its remote generating atations. Each of the 15 atations have a Computer Automation, Inc. Syfa 1000 minicomputer system, including 80M bytes of disk storage, four to 16 CRT terminals, one or two line printers and a synchronous data link control (SDLC) 32-byte processor that controls anywhere from one to six character printers, Blake said.

SNA is IBM'a plan for distributed processing that incorporates a hierarchy of hardware and software "layers." This SNA approach was intended to provide controlling atandards for network communications and procedures, Blake explained. Computer Automation reportedly manufactures the first independent minicomputer-based aystem to offer full compatibility with SNA operations.

The multiprocessing environment is particularly evident at Commonwealth, where the two mainframes are running a multitude of interactive and batch applications.

Each remote Syfa system is one physical unit to the network and locally supports up to 15 logical units by routing their data to the mainframe. Thus, on one communications line, a generating station Syfa system can send and receive multiple remote job entry batch transmissions and multiple interactive inquiries under IBM's Time-Sharing Option (TSO).

Prior to installing its distributed processing network, Commonwealth used CRT and remote batch terminals at the generating stations, Blake said. Users at each generating station are staff engineers, office supervisors and maintenance supervisors. Local off-line applications include budgeting and cost control, generating station maintenance schedules, processing instrumentation data and construction scheduling.

Applications programs are written and maintained by the corporate DP organization and "there is no shortage of requests from station management," Blake reported.

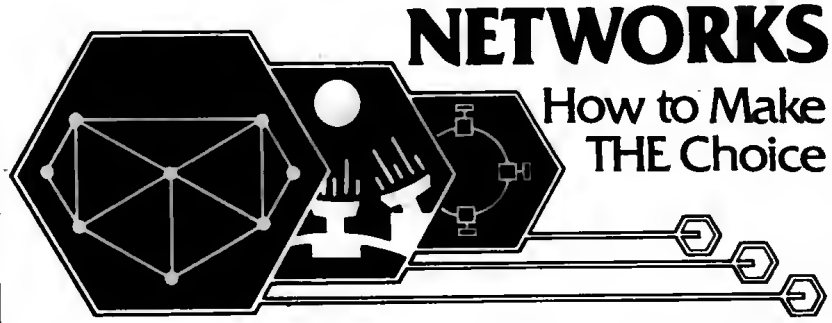
The overall data processing network at Commonwealth is anchored by the dual 3033 processors, each with 16M bytes of memory, and a 3705 front-end controller.

The three major elements of SNA are also present: Vtam is the network management software and runs on the host computer; the network control program runs on the 3705 controller and performs diverse housekeeping tasks such as handling communications lines and buffering data transfers between the host and Syfa systems; and SDLC is the line protocol that governs data transfers between the host and Syfa systems.

The three types of applications implemented by the DP department reflect the versatility of the IBM Computer Automation SNA network, Blake explained.

TSO applications involve the routine daily transactions between each station and corporate headquarters, such as maintenance work scheduled or work requests for people and equipment assigned from a central

(Continued on SR/40)



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4 SNA
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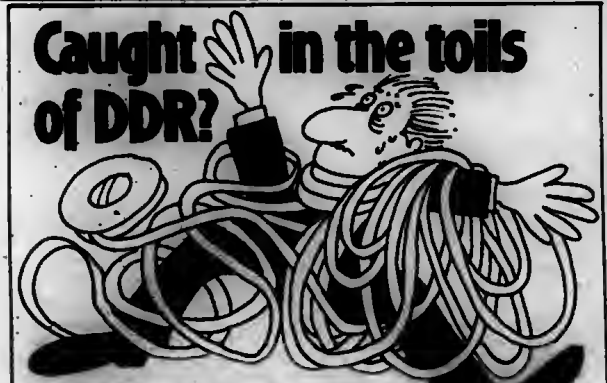

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SPECIAL**REPORT**

Carton Maker Packages Data for 30 Different Plants With Mini-Based DDP Net

EVANSTON, Ill. — How do you satisfy the need for quick information both out in the field and at a variety of remote locations? If you are Packaging Corp. of America (PCA), you do it by installing a centralized computer system at headquarters and operating a network of fully contained minicomputers at each of your branch offices.

At the moment, PCA, a manufacturer of corrugated cartons and supplies, has about 30 plants located around the country. At each plant a Honeywell, Inc. Level 6/43 minicomputer takes care of local business processing and keeps track of the local customer base within a 200-mile radius.

When additional information is needed by the regional plants, the computers can communicate with a dual-processor redundant Level 66/DPS large-scale computer system located here at the firm's headquarters. And information from the scattered sites can also be sent to the central computer to be shared by all the regional offices.

"Each plant has its own sales force that works with customers on a made-to-order basis," Arnie Rohlwing, director of the firm's systems and computer services operations, said.

"We needed a central computer system that could provide the plants with on-line access to local sales and production information, yet eliminate our need for outside time-sharing and batch processing at our suburban Chicago home office."

PCA started the conversion to the new Honeywell systems in 1979, replacing a Honeywell Series 2000 central system at headquarters that communicated via batch processing with Digital Equipment Corp. PDP-8 small systems installed in 24 container plants. The six carton plants were not equipped with computers.

Needed Interactive Capability

One of the company's main objectives in changing computers was to gain a large system capable of supporting on-line data base files and a large communications network.

"We needed the interactive capability of the Honeywell network as well as a reduction in the 24-hour turnaround time for batch processing," Rohlwing explained.

Versatility for the future added another requirement to Rohlwing's search for a new system.

"With the Level 66/DPS and the Level 6s, we can easily add memory and processing power to the network. Because our goal was to develop a functional distributed network using an on-line data base approach, in terms of speed and capacity the Honeywell systems' ease of field upgrades was very attractive to us," he said.

PCA's Level 66/DPS host system has 512K bytes of main memory that access more than 1.2B bytes of on-line disk storage, plus eight tape

DDP Gets Glowing Reviews

(Continued from SR/39)

office.

Data entry is performed by a Syfa terminal operator off-line so that information can be edited and corrected prior to transmission.

RJE applications occur with a weekly/quarterly frequency and involve reports on station performance and efficiency. Local applications universally focus on budget programs, while special applications generated locally may vary from station to station.

"When we develop an application for one station, however, we make sure all stations have the opportunity to use it," Blake said.

The DP department presently has about 10 Syfa programmers who are specialists in Computer Automation's Sybol language. They share a Syfa system with six terminals dedicated to program development in the Chicago headquarters.

Finally, nuclear stations under construction are using Syfa systems for budget and work scheduling programs. "This is one of the truly valuable side benefits of our distributed processing network," Blake explained. "It takes 10 to 12 years to build a nuclear station at an estimated cost of over two billion dollars.

"We expect these computers to pay for themselves before the station becomes operational."

'It's Our Daisywheel Page Printer.'

Systems Director A.L. Rohlwing (left) and Kirk Hile, lead computer operator, review a summary report generated by Packaging Corp.'s Honeywell Level 66/DPS at company headquarters in Evanston, Ill.

drives, 17 CRT terminals, two 1,200 line/min printers and card equipment. The system's Honeywell front-end network processor controls four communications lines that support the remote Level 6 small systems.

Each Level 6/43 computer has 246K bytes of main memory, an average of four to six CRT terminals, 52M bytes of formatted storage capacity, a 300 line/min printer plus a 120-char./sec printer.

Operators at the remote plants now can answer customer questions quickly by using their Level 6 small computers. Roll stock requisitions from the corrugated box and container plants are sent to headquarters where the distribution department schedules mill production via daily computer transmissions.

In turn, the mills transmit reports on the status of all roll stock orders. The container plants learn exactly what is available and when it will arrive by using the Level 66/DPS-to-Level 6 communications links. There is no need for them to call and check on shipments because of the on-line information they can access through our Evanston switching center.

The remote computers also provide prompt cost-estimating information, enabling salesmen to avoid delays of hours or even days in providing customers with price quotes.

PCA systems representatives are training each plant's staff on the effective use of their Level 6's capabilities. The plant computers handle order entry, billing, finished goods inventory, cost closeout and other functions.

Five-Minute Turnaround

PCA has 50 employees in its data processing organization, roughly half of whom are involved in program and system design and maintenance. Usually, they can get compiled programs back on the development terminals in five minutes instead of 24 hours, Rohlwing said.

The Honeywell system uses Cobol as a base language under the Gcos time-sharing facility.

According to Rohlwing, decentralizing with the Level 6 small computers will also improve local response time for the company. "However, only the power of a mainframe can handle the big jobs generated by our 15,000 customer companies and our 8,000 employees," he said. "These jobs include financial reports, fixed-asset accounting, sales summaries and corporate reporting requirements."

For example, the monthly financial closeout summary requires entry of all financial transactions generated at our 60 manufacturing locations, he noted. This processing load is handled by the Level 66/DPS in Evanston.

The Honeywell mainframe also frees PCA from costly outside time-sharing agreements. The company's previous system was not equipped to handle the sophisticated regression formulas and problem-solving programs incorporated in the new computer.

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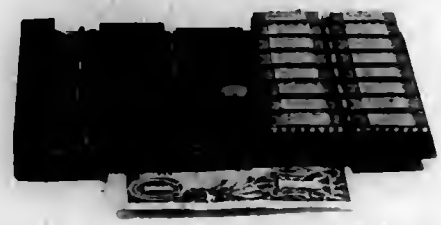

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How to Serve Corporation?

Debate Over DDP Leads McAuto to IRM

By Dave Berlin
Special to CW‡

The McDonnell Douglas Automation Co. (McAuto) has traditionally carried the responsibility for providing data processing support to the other components of the McDonnell Douglas Corp.

With the emergence of distributed data processing (DDP), McAuto found itself in the position of being not only the sole-source provider of centralized data processing, but at the same time the approval agency for all requests to distribute within the corporation.

Obviously, this situation was not conducive to feelings of confidence and good will between the components.

One of the best places to develop a distributed system is a high-technology organization, staffed with engineering-oriented employees. McDonnell Douglas is certainly no exception to that rule.

Over the last decade many of these engineers have become very successful at integrating microelectronic technology into widespread applications.

Many have become experts in the application and use of minicomputers, either at work or in their own homes. With this background, it can be very frustrating to be restricted in the use of new computer techniques simply because of "policies" established by the centralized DP organization.

On the other hand, there is no reason to believe an isolated group working on an esoteric technical project will necessarily make the best decisions on the use of the corporation's business data.

Growing Debate

The centralized vs. distributed debate grew to significant levels in certain areas of the corporation. No one will ever know how many general-purpose computer systems were assembled out of pieces of "laboratory equipment" or how many full-blown production applications have been executed as "interactive time-sharing jobs," scheduled from an unidentified dial-up terminal.

A corporatewide study was initiated, resulting in the implementation of an information resource management (IRM) organization. IRM officers were appointed at a vice-president or director-level within each component.

These individuals were then responsible for reviewing and approving all IRM activities within their respective components, with the corporate IRM office acting as the chief watchdog.

This process is still evolving, but the establishment of the IRM structure has done much to resolve the intensely political battles associated with DDP.

The question that remained was how McAuto could best support DDP efforts within the corporation. It seemed only reasonable to attempt to employ some of the same techniques developed during more than 20 years of experience with centralized processing. As a result, two DDP-related coordinating functions were implemented — DDP change planning and DDP daily planning.

The DDP Change Planning Committee is a manager-level group with representa-

(Continued on SR/46)

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IRM Group Formed to Solve Processing Debate

(Continued from SR/42)

tives from each of the major areas of McAuto (systems programming, operations, applications programming, data base services, data communications and the McAuto IRM office). The committee is intended to provide within McAuto coordination of plans, activities, issues and concerns at the mid-management level. Some of the more specific goals of this group include:

- Consolidating centralized visibility of DDP activities and planning to insure that appropriate areas are prepared to offer component assistance when required.
- Coordinating between host and distributed activities and planning to insure optimum interface.
- Encouraging uniformity in the way that DDP is handled so each installation can benefit from previous activities.
- Acting as an interface to IRM organization processes to insure that component requests are handled expeditiously.
- Establishing centralized DDP-related task forces to provide proper DDP planning and installation.

The DDP daily planning meetings were established to provide a forum for the discussion of activities associated with the daily management of DDP systems.

These meetings provide an opportunity for user representatives of DDP systems to sit down on a regular basis (frequency based upon requirements) with supervisor-level McAuto and vendor personnel to discuss plans for system usage, anticipated system hardware and software changes and any problems experienced.

Objectives of Approach

The objectives of a cooperative central/distributed approach to the management and administration of DDP sites include:

- Allowing user personnel to concentrate on the assigned mission of their organization, rather than on the day-to-day management and administration of data processing equipment and personnel. User management can then more effectively define how equipment is to be used and set priorities on the applications processed.
- Implementing user and centralized IRM responsibilities with minimum duplication.
- Making maximum use of the experience, knowledge and training of existing central management and data processing personnel, while providing expanded career opportunities within the corporation.
- Making maximum use of each DDP site for the benefit of its own users.
- Giving the users of each DDP site the maximum opportunity to establish performance and service criteria, as well as schedules.

The results experienced from the joint central/distributed philosophy include:

- A more stable processing environment as a result of prior experience in the management of data processing centers.
- A more stable personnel environment as a result of a large and diversified central data processing staff.
- DDP users can benefit from the availability of centralized state-of-the-art technology and expertise that could not be cost-justified on the basis of a single installation.
- The availability of 24-hour-a-day support personnel in the central site eases nonprime shift requirements.
- Reduced cost and better vendor service resulting from volume purchase discounts and single point-of-vendor contact.
- Consistent documentation and procedures resulting from common expertise and the sharing of information between similar sites.

In summary, McAuto has attempted to approach the DDP environment with as many of the centralized techniques as seem applicable. This approach allows the user to reap the benefits of distribution, but minimizes the impact on the corporation.

Borlin is manager of distributed processing at McAuto.

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DDP Taps Education Pipeline in Remote Alaska

Special to CW

JUNEAU, Alaska — In an Eskimo village two hundred miles above the Arctic circle, two teachers supervise 23 elementary and five high school students.

The temperature outside is -32°. It is twilight on a January midday. The sun will not rise for three weeks yet, and winter storms have prevented the mail plane from landing for 12 days. There is no other way in or out of this village. In distributed data processing (DDP) terms, this is a remote site.

A few years ago, the vast distances and often inclement weather of Alaska presented a challenging problem to educators in the nation's largest state. The government had mandated equal and effective education to Alaska's more than 14,000 children, most of whom live in remote villages.

But it seemed to be an impossible directive. Even by themselves, the personnel and transportation requirements that would be needed to comply with the new state law were staggering. In addition, the complexities of curricula planning for varying grade-levels and small class sizes were enormous.

Telecommunications Techniques

In 1975 Ernest Polley, coordinator of planning and research for the Alaska State Department of Education, and a group of colleagues decided to explore the use of telecommunications techniques to blanket the entire state with an easily tapped educational pipeline. The Electronic Telecommunications for Alaska (ETA) concept resulted.

In less than two years of research and development the team completed the system design and installed the first minicomputer, a Digital Equipment Corp. PDP-11/70, in Juneau. Eighteen test sites were then linked together with a pilot package of tentative educational programs.

With the initial system test completed, second-stage computer programming went full speed ahead. Now the project was broadened to include other elements that had been envisioned earlier, notably an electronic mail system (EMS) and computer-assisted instruction with direct student interaction via remote terminals, Polley said.

The vital link between the computer centers and users over the telephone circuits has been provided from the beginning by Racal-Vadic, Inc.'s Model 3455 1,200 bit/sec full-duplex modems, through which all incoming and outgoing data flows. As with the other elements of the system, the performance of the modems has been of paramount importance to the overall reliability and success of the ETA program, particularly since the inaccessible remote locations have been so dependent on normal system operation.

With the ETA system in place, the EMS has experienced explosive usage growth. The main hub of this EMS activity is the Juneau center where two PDP 11/70 computers are operated jointly by the Alaska State Department of Education and by the Marine Transportation System.

Outgoing "mail" messages for the various school districts are prepared off-line on a Gnat Computer, Inc. microcomputer using the local CRT terminal.

Once prepared, messages are stored on Gnat diskettes and then disseminated over the 11/70 systems to the remote user sites.

Incoming messages are received at the Juneau center and forwarded as required to the specific recipient anywhere in the state.

Each user has his own electronic mail box with an ID number, much as one would have a mail box at a local post office. The user can easily call for his mail instantly from his remote terminal location by using his code number.

Example of Electronic Mail

A typical example of electronic mail is depicted in the following scene:

A school superintendent in Ada, an island 650 miles west of the tip of the Alaska penninsula, receives a message through the computer terminal that an important workshop will be held in Anchorage on teaching language skills to hard-of-hearing primary children (hearing loss is a major health problem in Alaska).

By the end of the day, the superintendent has made arrangements for travel and notified the workshop sponsor, by computer message, that two teachers will attend.

The notice, had it been sent by mail, would probably not have arrived until the workshop was ancient history.

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Here's the Complete Computerweek Agenda! Use It to Select Sessions and Plan Your Schedule for March 2-5.

MONDAY, MARCH 1

7:30 - 9:30 p.m. — REGISTRATION

TUESDAY, MARCH 2

7:00 a.m. — REGISTRATION

7:30 - 8:45 a.m. — EARLY BIRD RAP SESSION

R-1 "Computing Power: Politics and How To Control It" Chairman: Brad Schultz, Senior Editor, Mgmt, *Computerworld*; Speakers: Professor Rob Kling, Dept. of Info. & Computer Science, University of California, Irvine; Elmer Steffervud, President, Network Management Assoc.

9:00 - 10:30 a.m.

A-1 "Managing EDP Resources for Greater Productivity" Keynote & Chairman: John Thompson, Vice President, Index Systems

A-2 "New Applications Opportunities in Telecommunications" Chairman: Professor Leonard Kleinrock, University of California at Los Angeles

A-3 "Vendor Markets - 1990" Chairman: Duane Kirkpatrick, Partner, Research, Robertson Coleman Stephens & Woodman; Speakers: Frank Kline, President, Pacific Technology Venture Fund; Robert F. Wickham, Vice President Marketing, Vector Graphics; Paula Lawrence, Manager, Marketing Research, Tymshare

11:00 a.m. - 12:30 p.m.

A-4 "EDP Productivity: Implications for the Manager, DP Practitioner and End User" Chairman: Werner Frank, Executive Vice President, Informatics. Speaker: Dan Merrill, Productivity Mgt. & Ed., Union Carbide

A-5 "Telecommunications Impact: Social, Organizational & Business Implications of Network World" Chairman: Dean Gillette, Executive Director of Corporate Studies, Bell Laboratories

A-6 "Communication Links: Word and Data Processing" Chairman: Alan Negrin, Director of New Product Planning, Harris Corporation, Digital Telephone Div.

12:30 - 2:00 p.m. — LUNCH

Featured Address: " 'Theory Z' — A Case History in Applying Japanese Management Techniques in an American Organization" Speaker: John Rehfeld, Vice President & General Manager, Toshiba Information Systems, Bradford Spencer, Spencer Assoc.

2:00 - 3:30 p.m.

B-1 "Information Management Planning" Chairman: Clive Finkelstine, Information Methods (USA)

B-2 "Organization Modeling for MIS Departments" Barry Stevens, Vice President, Performance Management Associates

B-3 "IBM Software Strategies For The 1980's" Robert Cook, Vice-President, VM Software

B-4 "Application Potential & Planning for Local Networks" Frank Drubek, President, Communication Network Architects

B-5 "Future of System Network Architecture & Applications Environment" John King, President, K3 Group

B-6 "Future of PCM" Chairman: L. Duane Kirkpatrick, Partner, Robertson Coleman Stephens & Woodman; Speakers: Charles Cornell, Director of Software Support, IPL Systems; Michael Backler, Director of Marketing, Nixdorf Computer, Molly Upton, *EDP Industry Report*

3:45 - 5:15 p.m.

C-1 "Reducing System Development" — Life Cycle Costs Gopal Kapur, President, Kapur & Associates

C-2 "Three Key Processes for Effective DP Management" Chairman: Edward L. Prichard, Director of Management Systems, Institute for Software Engineering

C-3 "Guaranteed Systems: Application Development Through Hardware Concepts" Dan Nolan, Deputy Director, Business Data Processing, Computer Sciences Corporation

C-4 "Ethernet & Base Band Approach vs Broadband & Coax Nets" Frank Drubek, President, Communication Network Architects

C-5 "Using Non-IBM Terminals in SNA Environments" Saro J. Kar, President, Telecom Computer Technology

C-6 "Impact of Superminis on Business Systems" Chairman: David Anthony, Editor, *Computer System Reports*, Auerbach; Speaker: Edward Churchill, Western Regional Sales Manager, Perkin Elmer Corporation

WEDNESDAY, MARCH 3

7:30 - 8:45 a.m. — EARLY BIRD RAP SESSION

E-2 "Have Users Cut The IBM Apron Strings?" Chairperson: Marcia Blumenthal, Senior Editor, Industry, *Computerworld*

9:00 - 10:30 a.m.

D-1 "Software: New Languages & The Application Development Process" Chairman: Martin Goetz, Vice President, Applied Data Research; Speaker: Karen Garmater, Manager, Information Resource Center, Lincoln National Life Insurance Company

D-2 "Operating Systems: Outlook for User Independence" Chairman: Ann Lanum, Vice President, Pansophic Systems; Speakers: Robert Marsh, President, Plexus Computer; Edward Churchill, Western Regional Sales Manager, Perkin Elmer Corporation; Jean Yates, Consultant, Gnostic Concepts

8:45 - 9:00 a.m.

Welcome To The OEM Business Forum: Pat McGovern, Chairman, International Data Group

D-3 "The Economic Outlook for The OEM ... Boom or Gloom?" Chairman: Sonny Monsoon, Chairman, American Computer Group, Inc.; Speakers: David E. Raphael, Senior Economist; R. Joseph Stockhus, Management Systems Consultant, SRI International

11:00 a.m. - 12:30 p.m.

D-4 "Strategies & Implementation of The Corporate Data Base" Leo Cohen, President, Performance Development Associates

D-5 "Application Packages: An Architectural Assessment Methodology" Stuart Orr, Senior Partner, Orr Associates

D-6 "Japanese Vendors Meet The Press" Chairman: Peter Bochner, Los Angeles Bureau Chief, *Computer Business News*; Speakers: John Rehfeld, Vice President, Information Systems Division, Toshiba; Kay Nishi, Microsoft; Robert J. Cowan, Vice President, Marketing, C. Itoh Electronics, Inc.

12:30 - 2:00 p.m. — LUNCHEON

Featured Address: "Venturing in the 1980: Outlook for New Computer Industry Companies" Speaker: Roy Rogers, Managing General Partner, Hambrecht & Quist

2:00 - 3:30 p.m.

E-1 "Large Processor Architecture Evolution" Chairman: Brian Jeffery, Director, Comp. Industry Research Strategic, Inc.

E-2 "Mainstream Choices in Database" Chairman: Charles Bachman, Vice President, Cullinane Data Base Systems

E-3 "On Line Program Development" Chairman: Jack Ewers, Manager Systems & Programming, Honeywell, Inc.

E-4 "The Vertical Marketing Survival Guide" Chairman: Lawrence D. Dietz, President, The Alec Group San Jose, CA; Speakers: Susan Croft, President, Susan Croft Associates; Dan Cotten, President, Parameter Driven Software

E-5 "Complex Legal Issues Affecting The OEM" Chairman: Richard Rayman, Attorney, Brown & Raysman; Speaker: Peter Vogel, Attorney, Peter S. Vogel P.C.

E-6 " 'Retail' Takes On A New Meaning For The OEM" Chairman: Deborah de Peyster, East Coast Bureau Chief, *Computer Business News*; Speakers: Robert Wickham, Vice President, Marketing, Vector Graphics; Pam Inserra, Vice President, Future Computing; Joel H. Skolnick, Vice President of Finance and General Manager, Computer Store, Inc.

E-7 "Marketing Strategy Tools To Insure Continued High Profit" Speaker: Jack M. Keen, Director, Management Products, Input

3:45 - 5:15 p.m.

F-1 "Survivable Systems" Dr. William H. Highleyman, President, Sombers Associates

F-2 "Database Design for Distributed Systems" Hugh W. Ryan, Arthur Andersen & Company

F-3 "Measuring and Improving Programmer Productivity" Girish Parikh, President, Shetal Enterprises

F-4 "Software For The Vertical Marketplace" Chairman: Warren N. Sargent, Jr., Palo Alto Management Group; Speakers: to be announced

F-5 "Financial, Banks & Insurance Companies . An OEM Opportunity" Speakers: Russell H. Dewey, Management Systems Consultant; Robert Jones, Insurance Industry Consultant; Martin Tucher, Director Commercial Banking Department, SRI International

F-6 "The Process Control Industry ... An OEM Opportunity" Speaker: Partricia Whiting-O'Keefe, Director of Advanced Computer Systems, SRI International

F-7 "Maintaining Your Margins Through Manufacturer Support" Chairman: Ron Mion, Senior Partner, Systems Marketing Associates; Speakers: John Mather, Vice President, Marketing, Point 4; Ron Omohundro, Director, Small Business Systems, THE TRW-FUJITSU COMPANY, John Osborne, Regional Sales Manager, Apple Computer; Mike Seashols, Vice President Marketing, Dynabyte

THURSDAY, MARCH 4

7:30 - 8:45 a.m. — EARLY BIRD RAP SESSION

R-3 "Stop Throwing Work Stations At The User Productivity Problem" Chairman: Steven Schur, President, Mini Max Systems

9:00 - 10:30 a.m.

G-1 "Why Management Hates DP" Walt Lankau, Vice President, Management Decision Systems

G-2 "Personnel Crunch In Data Processing" Harold S. Bott, Partner, Arthur Andersen & Company

G-3 "OEM Technology: An Overview" Chairman: Vic Farmer, Editor, *Computer Business News*; Speakers: Andrew Roman, Consultant, Roman Associates International; Jean Yates, Mgr., Microprocessor/Microcomputer Industry Analyst, Gnostic Concepts; David Mandelkern, Research & Development Planner, Cromemco, Inc.

G-4 "Perspectives of Sales Taxation of Software — The California Experience" Chairman: Rory O'Connor, Senior Editor, Software, *Computer Business News*; Speakers: Stephen N. Hollman, Attorney at Law, Lakin-Spears; Donald B. Mulvey, President, Computer Services Associates; Susan H. Nycum, Attorney at Law, Gaston Snow & Ely Bartlett; Richard H. Ochsner, Tax Council, California State Board of Equalization

11:00 a.m. - 12:30 p.m.

G-5 "DP — Role In Office Automation: Issues and Solutions" Chairman: Walter Ulrich, President, Walter Ulrich Consulting; Speakers: Robert Evans, Director of MIS, El Paso Co.; Susan Wintersteen, Office System Specialist, Bechtel Power Company; Andrew Piebalgs, Manager of Personal Computing, Gulf Canada Ltd.

G-6 "The Programmer Gravy Train Derails" Chairman: Thomas J. Franc, Director of MIS, Bekins, Inc.; Speaker: Charlene Fancil, Consultant, Quality Assurance, Security Pacific National Bank

G-7 "OEM Survival Tools In The 80s" Chairman: Richard Cole, President, Computer Results, Inc.; Speaker: Michael Wood, Partner, CPA firm of Andreoli, Johanson and Wood

2:00 - 3:30 p.m.

H-1 "Planning & Selling Office Automation Projects" Robert S. Elliott, Arthur Andersen & Company

H-2 "Building Careers in DP" Janet Benou, Janet Benou Associates

H-3 "Concepts & Trends in Information & Data Resource Management" Dr. Steven H. Spewack, Vice President, Performance Dev. Corp.

H-4 "Software ... The State Of The Art" Chairman: Ann Winblad, Vice President, Marketing, Open Systems, Inc.; Speakers: Robert D. Brannon, Marketing Manager, OEM Microcomputer Systems Operations, Intel Corp.; Andy Johnson-Laird, President, Johnson-Laird, Inc.; Bob Smith, Vice President, Marketing, Forth

H-5 "Push Button Code: Are Program Generators Just Tinkertoys?" Chairman: Chuck Butkus, The Software Factory; Speakers: William R. Stow III, Chief Executive Officer, Relational Systems International; Larry Downing, General Manager, D.J. 'Al' Systems Ltd.

H-6 "The Fortune 500 Manufacturers ... An OEM Opportunity" Chairman: Neil Kleinman, General Manager, Pacific Technology Center, IDC; Speakers: Gerald G. Cominer, Manager, Electronic Systems Laboratory, Technical Research Center, TRW Electronics; Larry Kromling, Director, Product Marketing, General Automation

H-7 "A Guided Tour of Corporate Finance: How to Get the Most Out of Clients, Bankers, Suppliers, Venture Capitalist, & Public Offerings" Chairman: Raymond P. Hass, Attorney, Howard, Rice, Nemerovski, Canady and Pollak; Speakers: Bruce Brough, Hill & Knowlton, Inc.; Roger V. Smith, Imperial Bank; Marshall C. Turner, Jr., Taylor & Turner Assoc., Inc.; Peter Wallace, General Partner, Hambrecht & Quist; Ronald L. Walters, President, COMARC Design Systems

3:45 - 5:15 p.m.

I-1 "Application Production Via Higher Level Languages" Jim Wilcox, Vice President, Hennce

I-2 "Cut Support Costs With Professional Documentation" Stephanie Rosenbaum, President, Tec-Ed

I-3 "The Local Network Avalanche" Chairman: Dr. Harry Saal, President, Nestar; Speakers: Larry Hartge, Vice President, Marketing, 3Com Corp.; Charles C. Bass, Vice President, Ungermann-Bass, Inc.; Mark Stieglitz, Manager, Local Networks, Western Digital; James C. Cogan, Vice President, General Manager, Small Business Computer Division, Datapoint Corp.

I-4 "The Independent Software Business Vendor" Chairman: Rory O'Connor, Senior Editor, Software, *Computer Business News*; Speakers: John Katsaros, Director of Marketing, Digital Research; Judy Ross, Marketing Manager, Intel Corp.; John Smallcomb, Market Segment Manager, Business Applications Systems, Data General

I-5 "The OEM Market Analyst ... A Look To The Future" Chairman: Tom Casalegno, Vice President/Publisher, *Computer Business News*; Speakers: Neil Kleinman, General Manager, Pacific Technology Center, Inc.; Lawrence W. Roberts, General Partner, Hambrecht & Quist; James N. Porter, President, DISK/TREND, Inc.

I-6 "The European Market ... How To Break In Successfully" Chairman: Christopher G. Codrington, Managing Director, Interco Business Consultants Ltd.; Speakers: Sergio Ferragut, Cullinane Corporation; H. E. James Finke, President, Commodore International

FRIDAY, MARCH 5

7:30 - 8:45 a.m. — EARLY BIRD RAP SESSION

J-1 "Corporate DP and The Microcomputer Revolution" Harold Kinne, Founder of Halkin Computing Corp.

9:00 - 10:45 a.m.

J-2 Panel: "Personal Computing: The Information Tool of Tomorrow, Today!" Moderator: Maggie Canon, Publisher, *Infoworld*; H.E. James Finke, President and Chief Operating Officer, Commodore International Ltd.; Seymour Rubenstein, President, Micro Pro International; Ed Gage, Director of Merchandising, Radio Shack; Gene Sherman, VP Market Development, Xerox Office Products Division

11:00 - 12:15 a.m.

J-3 "How to Choose a Vendor for Corporate Micro's" Mike Seashols, Vice President of Marketing, Dyna-Byte, Dennis Mandell, President, Online Micro Centers, Inc.

J-4 "Choosing The Right Computer For Your Potential" Thom Hogan, Osborne Computer

J-5 "After Visicalc, What?" Dan Bricklin, Chairman of the Board, Software Arts

12:30 - 2:00 p.m.

Luncheon Address: "The Business Personal Computer: New Users, New Challenges" Ken Parker, President, Executec Software

2:00 - 3:00 p.m.

K-1 "Local Networking of Personal Computers" Bob Metcalfe, 3Com Corporation; Harry Saal, President, Nestar

K-2 "The Executive Workstation" Jean Yates, Gnostic Concepts

K-3 "The Market for Personal Computers" Ed Cherlin, Director of Personal Computer Research, Strategic, Inc.

K-4 "Legal Office Applications" John D. Rome, J.D., Vice President, Informatics Inc

K-5 "The Classroom of the Future" Liza Loop, Technical Coordinator, Computertown, USA

3:10 - 4:10 p.m.

L-1 "Microcomputer Components" Mike Swaine, Senior Editor, *Infoworld*

L-2 "CP/M vs. UNIX" Jean Yates, Gnostic Concepts; John Katsaros, Director of Marketing, Digital Research

L-3 "Microcomputer Software: Problems & Pitfalls of Licensing" G. Gervaise Davis, III, Senior Partner, Schroeder & Davis Inc.

L-4 "Accounting Applications"

L-5 "Computers & Fun Potential" Nolan Bushnell, Pizzatime Theatre Founder

4:20 - 5:20 p.m.

M-1 "Maintenance & Service Contracts" John Harnett, Director of Business Development, TRW

M-2 "Microcomputers: Lease or Purchase?" Paul Sorenson, Division Vice President, Dearborn Computer Co.

M-3 "Programming Languages: What's Ahead?" Gordon Eubanks, Senior Vice President, Digital Research

M-4 "Graphmatics"

M-5 "User Friendly Documentation" Chairman: John Zussman, Director of Research, Avalanche, Inc.; Jeff Raskin, Manager of Advanced Systems, Apple Computer

"This agenda is subject to change.

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Ethernet Coming This Year in MSI Chips

By Brad Schultz
CW New York Bureau

NEW YORK — Ethernet will come to users this year in medium-scale integration (MSI) chips. Intel Corp. will make the chips for products sold by Xerox Corp., Digital Equipment Corp. and other vendors, the press was told here recently, and the cost of each chip will decline to less than $200 by 1985.

Intel, Xerox and DEC — the three vendors that jointly announced the Ethernet local networking scheme in 1979 — were represented at the press briefing by Intel Corp. Vice-Chairman Robert Noyce, co-inventor of the integrated circuit; Xerox Vice-President David Liddle; and DEC Vice-President Gordon Bell. Other spokesmen for the three vendors joined in the discussion, which featured the following assertions:

• According to Xerox scientist Robert Printis, Ethernet could in theory run on fiber optic and broadband media, even though the local net protocols are presently offered for baseband data communications and broadband is widely considered a fiercely competitive alternative.

• According to Liddle, "The only way to have a catastrophic failure of an Ethernet is with a hatchet" — unless terminating circuits are jarred loose or damaged.

• According to Bell, Ethernet will be the standard approach to local-area communications in the '80s, but may be obsoleted in subsequent decades by "some sort of super fiber" or other medium yet to be conceived.

• According to Printis, five vendors will sell Ethernet transceivers, nine will sell Ethernet controllers, four will sell Ethernet controller chips, three will sell Ethernet cable, 10 will sell Ethernet systems and 10 will sell Ethernet workstations. Allowing for overlap of commitments, these represent 22 vendors planning to support Ethernet in products, he explained.

• According to Noyce, Intel is developing a "high-speed" local net controller, incorporating very large scale integration chips, in compliance with Ethernet.

(Continued on Page 62)

With Protocol Processor

Asynch Terminals Linked to IBM Hosts

CAMBRIDGE, Mass. — Industrial Computer Controls, Inc. (ICC) has unveiled a protocol communications processor designed to interface up to eight asynchronous terminals to IBM-compatible host processors and two synchronous hosts.

The Model CA20 provides five levels of conversion. Link-level connection is assured by the use of an industry-standard interface, an ICC spokesman said, adding that communications code conversion ensures that one device will recognize the intended character sent by another device.

At the protocol level, the communications processor maps data from one protocol to another. Device emulation reformats the data to specifications on an emulated device.

At the device-characteristics level, the command and control codes of one device are transformed into those required by the other.

Terminals supported by the CA20 include the Digital Equipment Corp. Models VT 100 and VT 52, Hewlett-Packard Co. Models 2621 and 2640, the IBM 3101, the Informer, Inc. 304 and Televideo, Inc. Models 912 and 920.

ICC CA20 Communications Processor

The device emulates the IBM Systems Network Architecture (SNA) 3276 cluster controller and supports asynchronous terminals as 3278-type devices. On the synchronous link to hosts, the CA20 supports Ebcdic communications, while terminals communicate in the Ascii code on asynchronous links to the product.

Both half-duplex synchronous and full-duplex asynchronous communication can occur at switch-selectable line speeds up to 9,600K bit/sec. The device communicates with the host and terminals over RS-232-C communications links.

It can be connected either directly to the host, emulating data communications equipment (DCE), or it can be remote from the host communicating through synchronous modems and dedicated lines. It handles modem status lines to answer calls automatically on dial-up asynchronous lines.

The CA20 can be configured to support the Bell 212 or equivalent modem at either 300- or 1,200 bit/sec through automatic 300 bit/sec speed detection.

The processor can also be configured to switch asynchronous terminals between two 3270 lines. These lines may connect to the same host — to access different applications — or to different hosts.

It performs all screen-formatting functions in response to commands from the host. The field-oriented structure of the 3270 screen is fully emulated in the screen of the asynchronous terminal.

The unit also interprets keystroke sequences from the terminal to provide the standard keyboard functions of IBM 3278 terminals. The keyboards of most asynchronous terminals were not designed for compatibility with 3278 keyboards, the vendor claimed.

The CA20 incorporates a multitasking operating system that executes on a Zilog, Inc. Z80 microprocessor. Communications with the asynchronous and SNA lines is provided by line driver modules configured to match the characteristics of the received data and the communications medium transmitting the data to the CA20.

It costs $9,700 from ICC, 196 Broadway, Cambridge, Mass. 02139.

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Omeganet Links DP, WP Devices

ANAHEIM, Calif. — Compucorp has unveiled a local-area network designed to link its word and data processing devices.

Omeganet emphasizes a departmental grouping of two to 16 workstations which in turn can be connected in network fashion to any number of additional departmental networks. Thus, any workstation in any subnetwork can communicate with any other workstation or data base.

The approximate price of a typical Omeganet with seven workstations is $48,000, Compucorp said from 2211 Michigan Ave., Santa Monica, Calif. 90404.

With Mainframes, Hand-Held Units

HP 80s Get Communications Capabilities

PALO ALTO, Calif. — A modem, interface and software from Hewlett-Packard Co. are said to extend the capabilities of HP Series 80 microcomputers to communicate with large mainframe computers and HP hand-held computers.

The HP 82950A Series 80 modem — said to turn a Series 80 into a networking machine — is Bell 103-compatible with autodial and autoanswer features and operates at 50- to 300 bit/sec.

The software that accompanies the modem reportedly supports all these features. Modem and software cost $395, including phone cord and manual.

The Data Communications Pac uses the RS-232 serial interface to communicate with a host computer at rates up to 9,600 bit/sec, either connected directly to a serial port or via user-supplied modem. The pack is said to integrate a Series 80 into a company network as an intelligent terminal. The HP 00085-13044 costs $200, including manual.

The HP 82938A HP-IL interface allows communication between Series 80 and hand-held computers. The interface card plugs into the personal computer, tying it into the HP interface loop.

Transfer rates are in excess of 3K byte/sec, according to the firm. The interface costs $295, including one-meter cable and manual.

More information is available from HP at 1820 Embarcadero Road, Palo Alto, Calif. 94303.

Ethernet Chips Out This Year

(Continued from Page 61)

A broadband Ethernet? Printis explained that broadband communications, where data is propagated through coaxial cable at radio frequencies, could support Ethernet, but difficult problems in collision detection would first require resolution. New modem designs would also be required, he said.

The Xerox scientist added that 10M bit/sec — the data speed Ethernet delivers — is more than adequate for the commercial DP environments Ethernet products will serve. Critics have suggested that 10M bit/sec may prove too slow, eventually, for some applications, he stated.

DEC has not joined Xerox in offering a number of Ethernet products, but Bell, which has led research and development at DEC since its earliest days, declared "What the [DEC] Unibus did for minicomputers, Ethernet will do for the fifth generation [of computer equipment]."

What Unibus did for minis was to consolidate communications among CPUs, main memory, disks and interfaces to the external environment in a single, high-speed bus.

Evolutionary Fashion

"Ethernet will be used initially in an evolutionary fashion," he declared, "to interconnect networks of today's computers to each other and to terminals and personal computers. Since Ethernet is [about 1,000 times faster] than today's network links and easily used to form networks, we expect a rapid transition to a tightly integrated network where the network is the system."

Bell said that, in such a fifth generation, "separate function computers . . . will be tightly integrated, interchanging many types of messages such as files, computed graphics, pictures and voice." DEC, Bell emphasized, is committed to Ethernet as a standard. The firm already employs Ethernet internally, he indicated, and will announce Ethernet-compatible products "in the near future."

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Design and develop a high throughput, high reliability Data Base Management System. The Data Base Processor consists of multi-super-mini's and various intelligent peripherals utilizing PASCAL. Requires 5-8 years experience in several of the following areas: data base management systems; operating systems; compiler development; or system utilities.

SOFTWARE ARCHITECTS
Design architecture for an on-line real-time transaction-oriented system. Expertise in the design of a large-scale, multiple release, software system such as ticketing, reservations, financial transactions, and/or information network systems -- especially in a distributed mini-communications network environment.

COMMUNICATIONS SOFTWARE DESIGNERS
Will design front end processors and communication networks. Requires 5+ years experience in telecommunications software both networking and protocol definition.

TEST AND INTEGRATION ANALYSTS
A background in software and systems testing methodology for large-scale systems. Prefer 2 years on-line programming experience.

MICROPROCESSOR DESIGNERS
Design and implement applications on microprocessors or home computers. Requires 5-10 years design and programming experience, minimum one year experience with microprocessors. (preferably 6502 or 8080, Z80, 8086 assembly language)

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CRT Terminal Runs Like VT100, 131, 132

ANAHEIM, Calif. — A CRT terminal that provides both 80- or 132-col formats and is plug-compatible with Digital Equipment Corp.'s VT100, VT131 and VT132 is available from Cobar, Inc.

The Model 3132 features a high-resolution, nonglare 15-in. screen. Editing capabilities for line and character insertion or deletion are standard on the 3132, as are a DEC-compatible printer port, detachable keyboard and 256-char. receive buffer.

The terminal's microprocessor design can be modified to run on virtually any computer system, a company spokesman claimed.

Reverse video, blinking and underlining capabilities are standard features. Batch transmission includes line, partial or full screen. RS-232C communications with selectable transmission rates from 50 to 19.2K bit/sec with full duplex and selectable local echo are provided.

The Cobar 3132 costs $1,595; OEM discounts are available. Delivery is 90 days after receipt of order.

Cobar is located at 1181 N. Fountain Way, Anaheim, Calif., 92708.

Controllers Handle Print For IBM 8100

MOBILE, Ala. — Quality Micro Systems, Inc. has introduced two IBM-compatible printer controllers.

The Magnum 8100 allows the Printonix, Inc. printer/plotter to run in the IBM multiuse communications loop environment, which is used on the IBM 8100 and other IBM systems.

The controller will allow the Printonix printer to look like the IBM 3287 Models 11 and 12 printers, the vendor said.

The Magnum 8100 costs $3,995.

The Magnum 3276 reportedly allows the Printonix printer/plotter to interface to the IBM 3276 or 3274 A adapter controllers. In this environment, the Magnum 3276 will look like the IBM 3287 Models 1 or 2 printers, the vendor said. It will reportedly perform normal line printer functions as well as bar code and forms generation.

It costs $3,495, according to Quality Micro Systems. The firm can be reached through P.O. Box 81250, Mobile, Ala. 36689.

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Systems/34, Asynch Terminals Tied

BURR RIDGE, Ill. — Sweeney Computing Corp. has announced the release of Access/34-Model II to run on the IBM System/34.

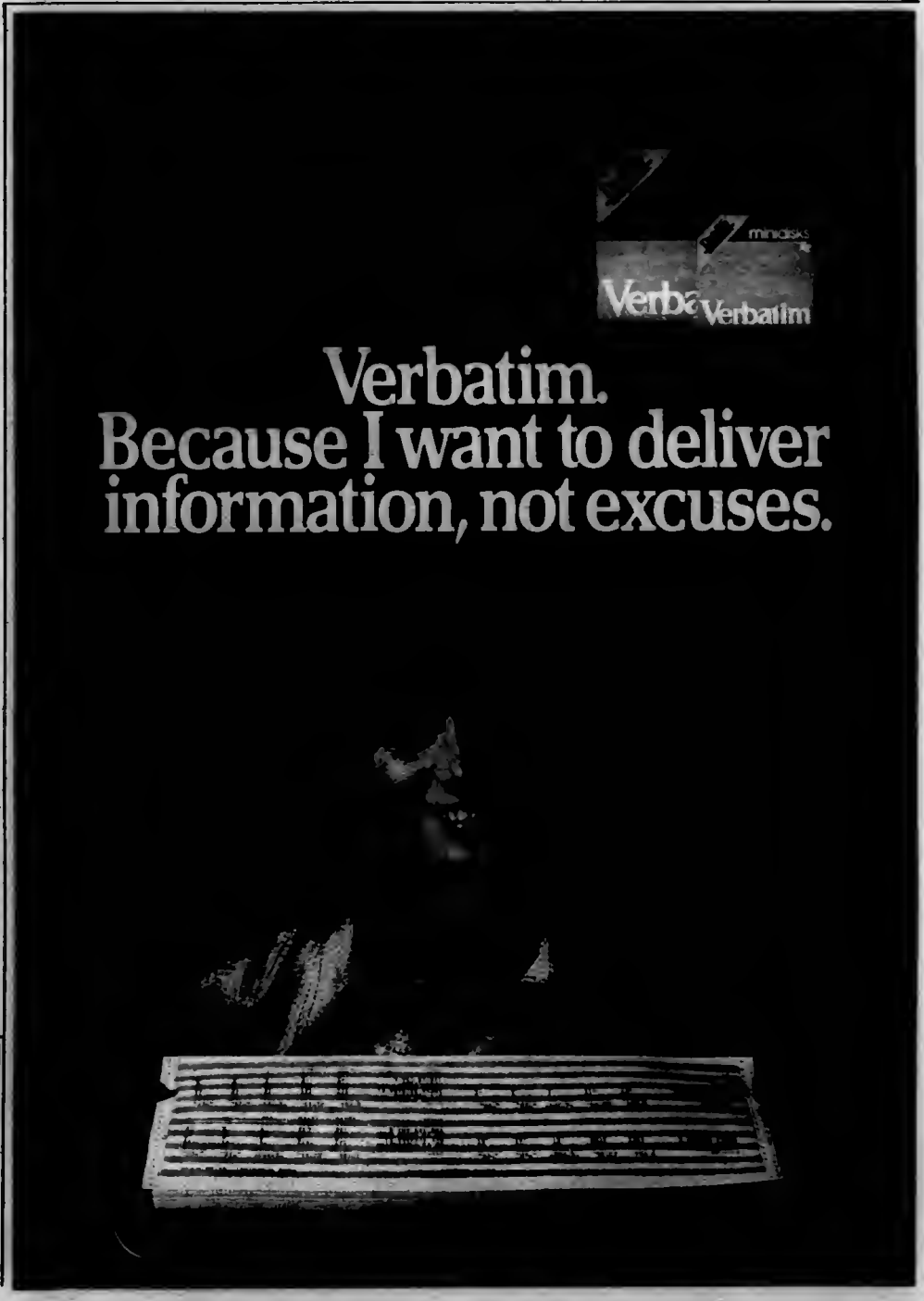
This package allows the system to communicate with asynchronous devices and is now available in a modified version for the user whose communications requirements are limited to one or two asynchronous devices, according to the vendor.

The Access/34-Model II reportedly enables the user to connect personal computers, teleprinters, word processors and graphics printers to the System/34 via two serial ports configured for external modems.

The connection to the System/34 has a preset transmission rate and includes a modem eliminator.

Options include conversion of either asynchronous port to 300 bit/sec internal modem with autodial capability, interactive spool writer software and interactive file transfer utilities for a variety of personal computers, the vendor said.

Purchase price of the Access/34-Model II is $3,995 from the vendor, 60 Shore Drive, Burr Ridge, Ill. 60521.



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Compatible With Bell 202

Rixon Unveils Modem, Statistical Mux

SILVER SPRING, Md. — Rixon, Inc. has unveiled a data modem and a statistical multiplexer.

The Model T202S data modem transmits and receives serial binary data at speeds to 1,200 bit/sec asynchronously half duplex over the direct distance dialing (DDD) switched network.

The large-scale integration data modem is compatible with all Bell and Rixon DDD 202-type data modems. It can be equipped with a 387 Hz frequency reverse channel with signaling rates up to 5 bit/sec. The reverse channel option allows simultaneous two-way transmission on the two-wire DDD network.

The 5 bit/sec reverse channel may be used as a supervisory signal for error detection and control to inform the transmitting modem that the signal is being received.

It costs $595 without the reverse channel option and $695 with the reverse channel option.

The Model DCX836 statistical multiplexer is an intelligent device offering error-free transmission of up to 60 asynchronous channels over one composite link. The unit consists of three basic types of card modules: the low-speed channel module (LSC), the automatic repeat request module (ARQ) and the buffer module (BUF).

Each LSC card module occupies one slot and accepts up to four asynchronous inputs. Data rates can range from 50- to 9,600 bit/sec in any five, six, seven or eight-bit code.

The ARQ card module occupies one card slot and performs the composite link interface function, passing data at speeds to 19,200 bit/sec. Frames of the data are transmitted by the module and simultaneously put into memory.

The BUF card module occupies one card slot and performs the data buffering function. Each card module provides 16K characters of storage.

The stand-alone model starts at $6,260, Rixon said from 2120 Industrial Pkwy., Silver Spring, Md.

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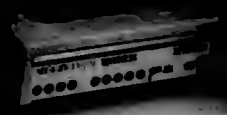

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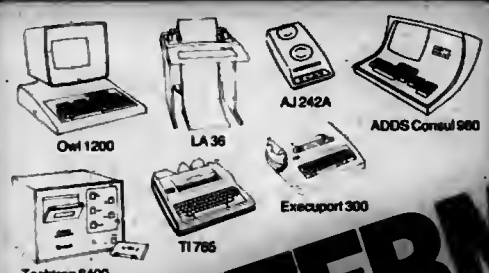

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Modem Directs 75 Channels

ST. PAUL, Minn. — Full-duplex broadband modems capable of accommodating 75 separate point-to-point, or multiple-drop data channels and costing less than $500 have been introduced by Interactive Systems/3M, Inc. (IS/3M).

Dubbed the Model 925 series, the asynchronous modems propagate data signals at radio frequencies and were initially designed to operate with an RS-232 interface, according to IS/3M.

The 925 series includes a Model 926 head-end unit and a Model 927 remote unit. The modems can be run in a multiple remote configuration when used with an IS/3M Model 460 data remodulator, the company said.

Attach Modem Bows

At the same time, IS/3M announced the Model 6600 series baseband IBM attach modem. This model allows communications between an IBM 3274 control unit and up to 32 remote terminals over a single RQ-62 type coaxial cable, according to IS/3M.

The 6600 modems are available in 32-port, 8-port and 4-port configurations, and pricing ranges from $2,350 to $5,750 per unit. More information can be obtained from Interactive Systems/3M, Department TL82-303, P.O. Box 33600, St. Paul, Minn. 55133.

Rixon Unit Features Reverse Channel

SILVER SPRING, Md. — Rixon, Inc. has unveiled a modem that transmits and receives serial binary data up to 1,800 bit/sec asynchronously half-duplex over two-wire, or full-duplex over four-wire-type 3002 or equivalent private lines.

The Model T202T is compatible with the Bell 202 and 829 data auxiliary sets. It can be equipped with a 387 Hz frequency reverse channel with signaling rates up to 5 bit/sec. The reverse-channel option allows simultaneous two-way transmission on two-wire facilities and the 5 bit/sec reverse channel may be used as a supervisory signal for error detection and control.

The price of a stand-alone model without the reverse-channel option is $495; the reverse-channel option costs another $100, Rixon said from 2120 Industrial Pkwy., Silver Spring, Md. 20904

Micom Unveils Three Modems

CHATSWORTH, Calif. — Micom Systems, Inc. has introduced three models of modems intended for full-duplex short-range operation:

- The Model 401 Asynchronous Local Dataset transmits data up to eight miles at 1,200 bit/sec or up to 9,600 bit/sec for 2.5 miles over four-wire private or leased metallic circuits. It costs $250 or $180 rack-mounted.
- The Model 402 Smart Asynchronous Local Dataset features dial-up emulation. It operates over either two- or four-wire circuits, transmitting at 1,200 bit/sec up to 10 miles or at up to 19.2K bit/sec for two miles. The Model 402 costs $330 or $270 rack-mounted.
- The Model 421 Synchronous Local Dataset is intended for high-speed synchronous operation. It can transmit up to nine miles at 1,200 bit/sec or at up to 19.2K bit/sec for up to three miles. It costs $370 or $300 rack-mounted.

Micom is located at 20151 Nordhoff Ave., Chatsworth, Calif. 91311.

Modem Built For Short Range

SUNNYVALE, Calif. — A modular, synchronous, limited-distance modem with switch-selectable data rates to 28.8K bit/sec has been announced by Prentice Corp.

The SLD-MKII is designed for high-speed, high-density data transmission over private two- or four-wire networks. The modem features system diagnostics, state-of-the-art Cmos design technology and front-panel controls and indicators.

The unit reportedly is designed to operate in point-to-point or multipoint/polled arrangements in either half- or full-duplex modes. At 2.4K bit/sec, operating ranges to 19 miles are possible, while at 28.8K bit/sec it operates up to 2.5 miles. The unit costs $420 from the firm at 266 Caspian Drive, Sunnyvale, Calif. 94086.

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Data Briefs

Communications Buffer Boasts Store-and-Forward

GERMANTOWN, Md. — A communications buffer capable of store-and-forward, protocol/format conversion and data acquisition has been developed by Digital Computer Systems, Inc.

The DCS-8900 reportedly can use a Winchester disk as a large, bidirectional first-in, first-out message buffer, enabling the interfacing of different transmission rates and protocols. The unit handles a mix of protocols, ranging from 50 bit/sec to IBM's Synchronous Data Link Control, the vendor said.

With its four basic input lines expandable to 480, the unit can be used by any system through an RS-232C interface. Pricing starts at $1,800 from the vendor at P.O. Box 180, Germantown, Md. 20874.

RS-232 Compatible Unit Bows

SANTA ANA, Calif. — An RS-232-compatible minifloppy storage device is available from Western Telematic, Inc.

The Minimate III provides up to 408K bytes of storage on a single-sided diskette. Operation is codable 7-bit Ascii or 8-bit binary. Binary operation provides for storing 8-bit program codes for microprocessors and machine-tool applications, allowing punched paper tape units to be replaced with 5¼-in. diskettes.

Other features include dual RS-232 ports for insertion between terminal and modem, dual transmission rates and answer back message, X-on and X-off code response.

The Minimate costs $1,475 from Western Telematic, 2435 S. Anne St., Santa Ana, Calif. 92704.

Fiber-Optic Mux Offered

CHATSWORTH, Calif. — A fiber-optic time-division multiplexer has been announced by Phalo/O.S.D. Corp.

The OMX-9608 can be used for computer-to-terminal links, secured communications links and links between process control equipment. The unit is plug-compatible with standard RS-232C equipment, the vendor said.

The multiplexer provides full-duplex data transmission on eight channels at speeds up to 19.2K bit/sec. Transmission can be either asynchronous or synchronous, programmable from the front panel keyboard, a spokesman said.

Available in a stand-alone or rack-mounted version, the multiplexer costs $2,700 from the firm at 9240 Deering Ave., Chatsworth, Calif. 91311.

VA3400 Gets Auto Dialer

SUNNYVALE, Calif. — Racal-Vadic, Inc. has announced that a built-in automatic dialer is now available in its VA3450 series of triple modems, which combine a VA3400, a Bell-type 212A and a Bell-type 103 in a stand-alone package.

The terminal operator can access the auto dialer via the keyboard or can call up telephone numbers stored in the dialer memory. Up to 60 digits can be stored in any number of combinations.

The option costs $75. More information is available from Racal-Vadic's Marketing Communications Department at 222 Caspian Drive, Sunnyvale, Calif. 94086.

Kit Upgrades Televideo

BETHESDA, Md. — International Systems Marketing has introduced the Interboard 9T Kit for upgrading its Televideo 912/920 terminal.

It has a 4 MHz Z80 microprocessor with 64K bytes of memory and a floppy disk controller that fits inside the terminal, the vendor said.

Peripherals may be attached via one RS-232 and one Centronics Data Computer Corp. parallel port. Among the options available are dual floppy and Winchester disk drives having 500K bytes to 40M bytes of storage, a spokesman said.

The price of the Interboard 9T Kit is $1,050, available from the vendor, 5161 River Road, Building 2, Bethesda, Md. 20816.

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Communications Versatility—The DS180 offers three interfaces including RS232, current loop and 8-bit parallel. Baud rates from 110-9600 may be selected. A 1K buffer and X-on, X-off handshaking ensure optimum throughput.

Forms Handling Flexibility—Adjustable tractors accommodate forms from 3"-15". The adjustable head can print 6-part forms crisply and clearly making the DS180 ideal for printing multipart invoices and shipping documents. Forms can be fed from the front or the bottom.

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In Equipment Acquisitions

Survey: CFO Carries Purchasing Clout

By Tim Scannell
CW Staff

WESTPORT, Conn. — When a major corporation wants to buy a large computer, who within that company has the most say on what kind of equipment will be acquired? And who has the least?

Not surprisingly, company treasurers or controllers have a great deal of "pull" when it comes to equipment acquisitions because their fingers are on the company's purse strings. However, it is the chief financial officer (CFO) who usually makes the final decision, weighing DP needs against other opportunities for use of the firm's capital.

DP managers play an important role in equipment acquisitions, usually by choosing the equipment, but lack the necessary spending authority.

These are the findings of a survey recently completed by Technology Finance Group, Inc. (TFG), an underwriter of leased high-technology equipment and tax-sheltered investments based here. The goal of the survey — which reportedly involved the chief financial officers of 65 of the largest U.S. industrial companies — was to chart the chain of command, acquisition strategies, financial analysis, investment and accounting principles used in acquiring large computer systems.

Nearly two-thirds of the CFOs acknowledged that management information systems (MIS) directors selected the hardware and provided the technological and operational reasoning for their choice. Managers do offer some financial justification for their equipment selections, even though 49% of the CFOs surveyed admitted that their DP executives had no training in financial techniques.

Fifty percent of the DP executives reported to CFOs; 28% to controllers and treasurers; and 22% reported to vice-presidents of administration or operation. More than half the DP managers required CFO approval for all purchases, while 47% could spend up to $250,000 without so much as a nod from the finance department.

Only 1% of the DP managers could spend more than $1 million on their own. Most commonly, the top MIS executive could approve rentals and timesharing without the permission of the firm's upper echelon. Least often they were given the authority to sign financing leases and outright purchases, which are the most costly and permanent acquisition techniques, the survey pointed out.

Approximately 30% of the CFOs surveyed favored financing leases — contracts that pay the cost of the computer in monthly installments. Twenty percent rented and another 20% used sale/leasebacks. Ten percent chose purchase with financing of one kind or another, the Technology Finance Group survey said.

What disturbs the financial officers most about computer acquisition? According to the survey, 45% were concerned with equipment obsolescence caused by frequent technological change. Surprisingly, although the CFOs admitted ignorance in predicting when obsolescence might occur, the majority tended to ignore forecasting services that predicted residual computer values. About 65% relied on their DP officers for

(Continued on Page 70)

Available in Four Models

Graphics Station Handles WP, DP

CAMBRIDGE, Mass. — GWP Corp. has announced Programate, a graphics workstation that reportedly combines interactive graphics, data and word processing features.

The unit is available in four models. The Programate 1000 was designed for preparation and maintenance of computer system documentation including system structure charts, flow diagrams, specialized forms or diagrammatical aspects of custom documentation requirements, the vendor said.

The Programate 2000 is an engineering workstation that can be used by an engineer as a desktop workstation to lay out and update schematics. It can also be used to automate the drafting process, for design documentation or for preparing technical publications, the vendor said.

Programate 3000 reportedly enables the user to prepare custom-designed forms or to exactly replicate existing forms as needed.

The Programate 4000 is said to offer special character sets for non-Roman alphabet languages. Features include diacritical marks. A single workstation can be used for multiple foreign languages, the vendor said. Each system includes a 15-in., 132-col by 40-line CRT display; a 124-button keyboard; and output capabilities for both graphics and correspondence, the vendor said.

Systems cost about $20,000, the vendor said from 196 Broadway, Cambridge, Mass. 02139.

Applicon CAD/CAM System Built on PDP-11/43 Processor

BURLINGTON, Mass. — A turnkey computer-aided design and manufacturing (CAD/CAM) system based on Digital Equipment Corp.'s PDP-11/34 processor was announced by Applicon, Inc. Called the Video Designer, the system includes the hardware and software for either mechanical/architectural or printed-circuit board design applications, the vendor said.

A basic system includes the PDP-11/34, an Applicon Graphics-32 display processor, a 200M-byte disk subsystem and an 800/1,600 bit/in. dual-density magnetic tape subsystem. In addition, the system features a black-and-white CRT workstation and a console numeric terminal.

Standard software includes either a printed-circuit board applications set or a mechanical/architectural applications set. The system supports either two- or three-dimensional software.

Systems cost about $150,000, the vendor said from 32 Second Ave., Burlington, Mass. 01803.

Multimedia Plotter Bows

SANTA CLARA, Calif. — Versatec Co. has announced a multimedia electrostatic plotter that was designed to draw on film and paper.

Available in plotting widths of 22-, 24-, 36- and 42-in., the plotters can draw on transparent and matte finish polyester film as well as opaque and translucent paper. Features include Look Ahead and "N + 1" line enhancements and mirror-imaging capabilites.

Units feature a switch-selectable 100 or 200 point/in. resolution, paper winders, a 96-char. Ascii and 124-char. scientific character sets, both on-line and off-line plotting controllers and I/O multiplexers, the vendor said.

The 22-in. unit costs $26,500, the 24-in. unit is $29,500, the 36-in. unit costs $41,500 and the 42-in. unit costs $53,500, the vendor said from 2805 Bowers Ave. Santa Clara, Calif. 95051.

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TI-783
TI-785
TI-787
TI-810/820P's

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The Analyzer Manages Magnetic Tapes

CHATSWORTH, Calif. — Data Devices International, Inc. has announced The Analyzer, a microprocessor-controller magnetic tape management system.

The unit controls all critical phases of tape handling. Features include error detection, error reporting and tape transport functions, the vendor said.

The vacuum column tape transport cleans, tests, analyzes, reconditions and rewinds a 2,400-ft reel of tape in 3.9 min. Standard features include three-track error detection, edge damage analysis, an adjustable testing threshold and a locked management panel, the vendor said.

The unit costs $15,995, the vendor said from 20235 Bahama St., Chatsworth, Calif. 91311.

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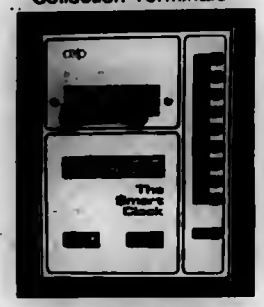

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Bits & Pieces

Racal Increases Prices 5% on Some Products

LITTLETON, Mass. — Racal-Redac, Inc., a supplier of turnkey auto-interactive computer-aided design and manufacturing systems, has announced a 5% price increase on some items effective March 1.

The products affected by the increase include the Mini stand-alone electrical design system, whose former price of $149,500 will increase by $7,500; the Cadence multiterminal PDP-11/34-based electrical design system, whose former price of $280,000 for a two-terminal system will rise by $14,000; the Vantage multiterminal, multiapplication system, whose old price of $260,000 for a two-terminal system will go up by $14,000; and the design stations for Cadence and Vantage, which will increase by $5,000 to $95,000.

The firm can be contacted through P.O. Box 7, Littleton, Mass. 01460.

Type Style Capacity Expanded for TR3

MANCHESTER, N.H. — Hendrix, Inc. has expanded the type style capacity of its Typereader Model TR3 optical character recognition system to include up to eight resident type styles and more than 50 font variations.

The firm also lowered the base price of its TR3 word and text processing system by unbundling some of its software.

Present TR3 system users can add type styles to their equipment at $500 each. TR2 users can also upgrade their systems to a TR3 for $8,500 plus $500/type style.

By unbundling its underline processing software, the firm also lowered the base price of its TR3 to $17,900. The underline processing, now offered as an option, costs $1,000.

Hendrix is located at 670 N. Commercial St., Manchester, N.H. 03101.

Reader/Decoder Out For RS-232 Systems

MAR VISTA, Calif. — New Wave Systems, Inc. has announced the CYC-48, a bar code reader/decoder for RS-232-compatible systems.

The unit reportedly can be plugged directly into a processor or it can be attached to a terminal. It can be used on an RS-232 cable at 9,600-, 1,200- or 300 bit/sec transmission rates. Data is verified, decoded and sent to the processor as Ascii characters. An optional voice output can be added, the vendor said.

The CYC-48 costs $650. The voice option is $245. The vendor is located at 12123 Washington Place, Mar Vista, Calif. 90066.

Modular Power Unit Boasts Four Channels

EL TORO, Calif. — Carlton Industries, Inc. has introduced a modular, programmable power supply, the Programmable Power Unit (PPU). The PPU is available with up to four separate channels and a choice of three voltage ranges for each channel: 0V to ±6V at 12A, 0V to ±18V at 10A and 0V to ±32V at 3.5A.

The user can control the PPU with its computer, over either an RS-232 or IEEE-488 bus.

The four-channel version costs $6,630 from Carlton Industries, Inc., 22661 Lambert St., El Toro, Calif. 92630.

Survey: CFO Has Final Say

(Continued from Page 69)

most "guesstimates," while others simply assumed a zero residual value.

Leasing computer equipment is popular with most of the CFOs in the survey. Nearly two-thirds dealt directly with computer leasing firms. Ninety percent of those were satisfied with the service, terms and delivery schedules arranged for their firms. When selecting a firm, most chose one on the basis of the cost of the lease followed by the financial stability of the leasing firm, the survey noted.

A copy of the survey can be obtained by writing on company letterhead to Technology Finance Group, Inc., 315 Post Road W., Westport, Conn. 06880.

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High-Capacity Winchesters Now Run on HP 250

PALO ALTO, Calif. — Hewlett-Packard Co.'s HP 250 small office computers now support the firm's high-capacity 16M-, 28M-, and 65M-byte Winchester disk drives — more than quadrupling the computer's previous maximum disk memory from 64M bytes to 260M bytes, the vendor announced.

All three disk units — the 7908P, 7911P and 7912P — are sealed Winchester drives with an integrated, high-speed cartridge tape backup. Except for their capacities, the disk drives are identical. In addition, the 28M- and 65M-byte versions operate about 30% faster than the 16M-byte 7908P and feature a more advanced error-correction scheme.

A typical HP 250 system with a 16M-byte 7908P disk drive costs about $22,500. However, the higher capacity drives can be substituted for the base drive, adding from $2,600 to $12,500 to the system price tag, a spokesman said.

Additional information on the drives and the HP 250 can be obtained from a local HP sales office.

College Fund Raisers Offered Turnkey Based on Wang VS

NEW HAVEN, Conn. — Computer Applications, Inc. has announced the development of the Fund Raising Education System designed to help colleges and universities raise money. The system is built around the Wang VS computer, which provides interactive entry and inquiry of data on CRT terminals.

The system was designed to work with fund raisers on every step of the fund raising process from campaign planning and donor targeting to implementation and tracking. It will target the appropriate donors and prospects from the alumni, parents, friends, corporations and foundations and group them according to various criteria, the vendor said.

The system also has word processing capabilities.

Both hardware and software are modular. The pricing for the hardware ranges in price from $50,000 to $150,000. The total hardware/software system ranges from $75,000 to $200,000.

Computer Applications, Inc. is at 81-89 Church St., New Haven, Conn. 06510

Turnkey Out For Car Fleets

PRINCETON, N.J. — A turnkey system for on-line, real-time fleet maintenance management and cost control was announced by Mainstem Corp.

The Fleetscan 2 system consists of an NCR Corp. minicomputer, terminals and printers and a software package developed by Mainstem. The real-time system was designed to provide on-site vehicle fleet information and to capture and report information needed to analyze and control fleet maintenance and operating costs.

The system enables clients to obtain current information, retrieve historical fleet data and create specific reports from their own data base.

The Fleetscan 2 system, including hardware and software, is available for $3,500/mo and up, depending on configuration. Support is available from Mainstem, P.O. Box 2, Princeton Forrestall Center, Princeton, N.J. 08540.

Latest HP 125 Features Both Hard, Floppy Disk

HP 125 Model 30

PALO ALTO, Calif. — Hewlett-Packard Co. recently beefed up its Model 125 small systems line by introducing a microprocessor-based computer that features both Winchester hard disk storage and removable flexible disk storage.

At the same time, HP cut prices by up to 21% on its previous HP 125 systems, the Models 10 and 20, introduced last August.

The newly introduced HP 125 Model 30 is architecturally similar to the Models 10 and 20, but offers up to 4.8M formatted bytes of mini-Winchester disk storage and 256K bytes of floppy storage for backup and data exchange. Both disk drives are packaged together in a dual-drive enclosure.

The entire system includes a dual-Z80 microprocessor-based CPU, 64K bytes of random-access memory, 10K bytes of display memory, a keyboard and CRT terminal.

According to HP, the Winchester addition to the HP 125 offers three main benefits: first, because the drive is sealed against contamination, data reliability is reportedly enhanced; second, the information transfer rate of the hard disk drive is about 50K byte/sec, with 250K-byte bursts, which makes the system more applicable to transaction processing, data base management and other complex applications.

And, finally, because the disk has a high storage capacity it does away with the "floppy swapping" necessary with flexible disk-based systems, a spokesman said.

The dual-disk system costs $8,250, with delivery in six weeks.

To increase the competitiveness of its HP 125 line, HP reduced purchase prices on the Models 10 and 20. The Model 10, with dual flexible disk drives that offer 512K bytes of storage, is now $4,950, down 21% from $6,250.

The Model 20, with dual 8-in. floppy disks that deliver 2.4M bytes of storage, now costs $8,580, cut by 19% from its former $10,580 price tag.

All of the HP 125 models are covered under HP's support umbrella, which ranges from factory repair to on-site maintenance.

Additional information on the computers can be obtained from local HP sales offices and personal computer dealers.

Micros Gain Print Buffer

BAYSIDE, N.Y. — Modular Microsystems, Inc. has announced the Model 200 print buffer. The unit allows microcomputer users to make simultaneous use of a printer and processor.

When connected, the print buffer allows printed information to be transferred at high speeds from the processor to the Model 200. The Model 200 then transfers the data at a slower rate to the printer. This frees the processor for other tasks, the vendor claimed.

The print buffer has a storage capacity of 80,000 print characters and costs $695, the vendor said. Modular Microsystems is at 28-17 201 St., Bayside, N.Y. 11360.

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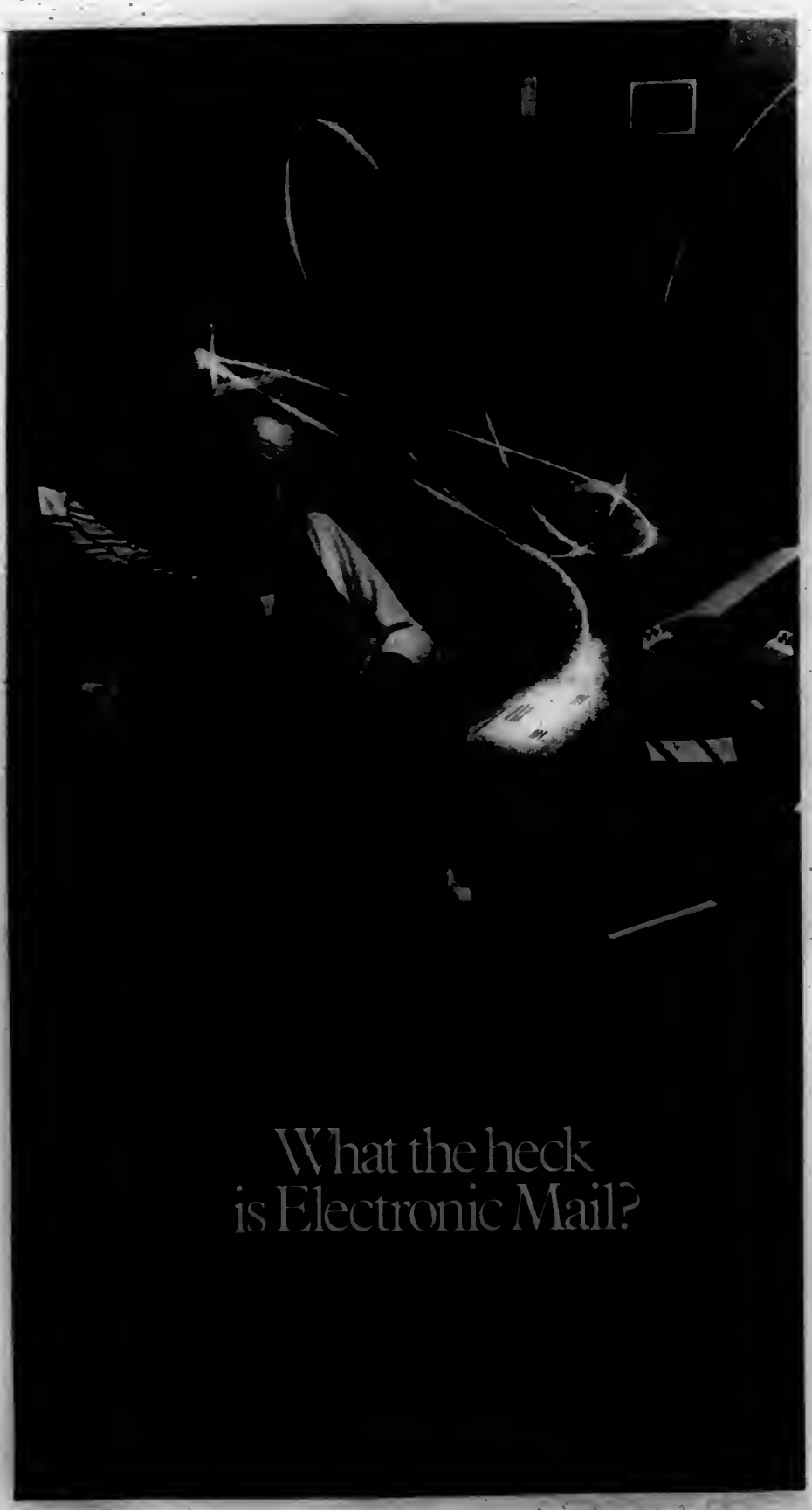

Electronic Mail is a term that's been bandied about data processing circles for years.

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For more information call Mr. Laurie Reeves at (800) 225-3222/3 (within the 617 area, call 552-2048). Or write him at Honeywell Office Automation Systems, Three Newton Executive Park Drive, Newton Lower Falls, Massachusetts 02162.

Honeywell

Because of WP's Evolution

Consultant Presses for WP Managers

By Bruce Hoard
CW Staff

SAN FRANCISCO — Despite the surge toward office automation, fewer than 20% of the Fortune 1,000 companies have word processing managers, according to Jan Rose, a marketing representative for NBI, Inc. and a word processing consultant.

Just as DP evolved from being a subset of the finance department, word processing is growing out of its role as an appendage to administrative services, Rose explained in an interview recently. She discussed three levels of word processing management that have been born of that process: the lead operator, word processing supervisor and word processing manager.

In distributed word processing environments, the lead operator is the most common of the three because "most companies are not progressive enough to assign a title and a position within their organization called supervisor," Rose commented. The lead operator is usually a system expert coworkers go to for advice and instructions. This person is also usually paid more than his or her colleagues.

In word processing centers there is usually a word processing supervisor, she said, adding that centralized environments are disappearing while distributed environments are becoming more prevalent.

Word processing managers are responsible for such areas as setting goals and procuring equipment. Of the three management types, only the lead operator actually works on a word processor. "Generally speaking, supervisors, just to live up to their titles, try to touch the equipment as little as possible," Rose said.

The growth of distributed word processing environments has fostered an atmosphere where word processing tends to be done in bursts, creating dead time between jobs and problems for word processing management, she agreed.

In some companies operators fill that void by doing what Rose called "management-type data information" on word processors. Those tasks include records management, communications into data bases and list maintenance.

The relationship between word processing and DP is a one-sided one favoring DP because "DP's got the bucks," Rose noted. She said she had never seen an organization that did not make word processing go through DP to make sure any newly acquired word processing equipment is compatible with existing DP hardware.

"Even though often the titles and the salaries are somewhat equal, word processing always takes a subservient role to DP," she said.

She also accused companies of having a "corporate attitude" that views word processors as "expensive typewriters." Typewriters are still considered secretarial tools and as a result, "they're delegated pretty low on the company priority list," Rose added.

Two Options

Asked how relatively powerless word processing management personnel should deal with anxious executives who want their jobs done unreasonably fast, Rose suggested two options.

One way to raise management's consciousness is by engaging in a "PR thing" featuring a "fickle finger of fate" for transgressors and some kind of trophy for the most understanding manager, she said.

Quarterly seminars featuring hands-on equipment demonstrations for department heads was Rose's second idea. Not only can they help them understand time requirements, but the department heads may also discover word processing capabilities they did not previously know about or understand.

When it comes to salaries, legal firms pay the highest salaries at all levels of word processing while banks pay the lowest, Rose claimed.

At legal firms, the average word processor operator earns between $1,400 and $1,600 per month; lead operators make between $1,600 and $1,800; supervisors get $1,800 to $2,000 while managers make $2,000 to $2,900.

In banks, the comparable figures are: operators, $1,000; lead operators, $1,200 to $1,300; supervisors, $1,500 to $1,600; and managers, $2,000, according to Rose.

Portable Terminal From DEC Offers 132 Columns, Plain Paper

MAYNARD, Mass. — Digital Equipment Corp. has introduced a portable hard-copy terminal for business executives that is reportedly the first to feature 132-column impact printing and the first to use plain paper.

The Correspondent keyboard send/receive terminal weighs approximately 20 pounds and was designed to be used either as a stand-alone terminal for minicomputer systems or a portable executive workstation. It is targeted to compete with portable thermal-paper terminals such as those offered by Texas Instruments, Inc.

The microprocessor-controlled unit can operate at 150 char./sec and has bidirectional printing, variable print width and multiple internal self-tests. It also features user-selectable transmission rates and parity, keyclick and horizontal spacing via the terminal's keyboard. The terminal also incorporates either a direct modem RS-232C interface or acoustic coupler to link it with remote computers.

Correspondent prints 9 by 9 dot matrix characters and has a full 128-character upper and lower case set; a user-replaceable print head with a minimum life expectancy of 300M characters; and can print 120 international character sets, including those of Great Britain, Sweden and France, a spokesman explained.

Graphics Capabilities

In addition to character output, the terminal has bit-map graphics capabilities with a 132- by 72 dot/in. resolution. It can be used with DEC's VT125 graphics CRT terminal and VK100 graphics-programmable keyboard, as well as to output stored graphics displays from a remote computer system, he said.

Correspondent can handle roll, fanfold, or single-sheet paper and has a pin-feed platen as a standard feature. It also has a switch-selectable power supply for 110 Vac or 220 Vac operations from 47Hz to 63Hz.

The terminal costs $1,995 with deliveries scheduled for this summer. Additional information is available from the firm at 146 Main St., Maynard, Mass. 01754.

The DEC Correspondent Terminal

Harris 1600 Gains WP Software

MELBOURNE, Fla. — Harris Corp. is offering a word processing software option for its Model 1600 distributed data processing systems users, as well as a WP application package for its entire range of superminis.

Wordplus provides Model 1600 users operating on a Harris multifunctional terminal sophisticated text editing capabilities. The package is loaded directly from the 1600 processor to the terminal itself, where it executes. In this way, the system's integrity is maintained, allowing the user to perform other functions such as interactive Cobol, remote job entry and others.

The one-time license fee is $2,300; the system may leased for $50/mo on a two-year contract.

The WP package for Harris' superminis is called Muse. A full-screen, cursor-controlled package, Muse licenses for a one-time fee of $8,500.

A letter-quality, 40 char./sec daisywheel printer is also available for purchase at $6,000 or on a two-year, $144/mo lease basis, Harris said from Melbourne, Fla. 32919.

Raytheon Offers Two WP Systems For Desktops

ANAHEIM, Calif. — Raytheon Data Systems Co. has unveiled two multifunction word processing systems in conjunction with the announcement that its former subsidiary, Lexitron Corp., is now fully integrated with Raytheon.

The single-diskette VT 201 and dual-diskette VT 202 word processors incorporate functions from the VT 1000 series and are comprised of two desktop units: an editor and a printer. The systems may be ordered with or without the printer. For instance, it is possible for six VT 201 or 202 editors to share one printer.

Both systems feature the following options: dual-sided disk drives, communications, math package, alternate character set, dual-tray sheet feeder with envelope feeder, records management system, twin-track printer and wide-track printer.

The VT 201 costs $7,505 and the VT 202, $8,755, Raytheon said from 1415 Boston-Providence Tnpk., Norwood, Mass. 02062.

Voice System Adds 1,500 Users

BURLINGTON, Mass. — A voice storage and retrieval system able to handle up to 1,500 subscribers is available from Commterm, Inc.

The Electronic Voice Exchange (EVX) applications include message-retention and call-answering facilities in the radio-paging and telephone-answering service industries and voice-mail network interface within a private branch exchange office environment.

The EVX allows remote access, hard-copy message transcription and transferal of messages to others within the system. The system costs approximately $130,000, Commterm said from 10 Third Ave., Burlington, Mass. 01803.

Micro-Based Office Tool

Graphwriter Boasts Eight-Pen Plotter

WALTHAM, Mass. — Graphic Communications, Inc. has introduced an office-oriented microcomputer-based graphics system with an eight-pen plotter.

Graphwriter contains 40 standard formats with which graphics requirements can be specified. These include bar charts, line graphs, tabular, Gantt and organization charts.

The company has compiled a booklet of the available formats, which includes a fill-in-the-blanks input form similar to a report form writer request input specification. A manager can thumb through the booklet, select the most appealing style of presentation, fill in the specification form and hand it to a clerk at the computer.

A typical specification form allows the person making the request to specify a title of up to three lines, a three-line footnote, labels for the X-axis and Y-axis, scaling factor, data values, legends, color and hatching pattern.

The Graphwriter costs between $14,000 and $18,000, depending upon the number of programs purchased. Graphic Communications is at 200 Fifth Ave., Waltham, Mass. 02254.

Software for Burroughs B100 Provides Full WP Functions

MINNEAPOLIS — Software that provides Burroughs Corp. B1000 computers with complete word processing capabilities is available from Lawson Associates

The Text Administration System (TAS) consists of two modules: a word processing system and an electronic mail system that allows messages to be automatically transferred between terminals.

The TAS software can access current files stored on the computer system and create additional files for word processing use. New documents can be created, added, changed, merged or deleted.

Complete turnkey installation including software, hardware and training is available. Each TAS module can be purchased separately or as part of a total system. The word processing module costs $4,500 and the electronic mail system, $6,000, Lawson said from Suite 390, 2021 E. Hennepin Ave., Minneapolis, Minn. 55413.

Commodore Gets WP Software

NEEDHAM, Mass. — Professional Software, Inc. is offering word processing software designed for use on Commodore Business Machines, Inc.'s microcomputers.

Wordpro 2 Plus requires a minimum 16K bytes of memory and is sold complete with both cassette and diskette versions. Priced at $199.95, it is compatible with most Commodore computers.

Wordpro 5 Plus turns the Commodore 8096 computer into a word processing system that can separate text areas. Multiuser capability (up to eight workstations) is available via the addition of a multiuser interface device.

The software can also be used on the Commodore 8032 with a 64K byte-memory expansion board installed. It costs $450 the vendor said.

Professional Software is located at 166 Crescent Road, Needham, Mass. 02194.

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8086/8087/8088 CROSS SOFTWARE PACKAGES

1 C cross compiler for the 8086. All facilities of the complete C language, including floating point for the 8087, are supported. Optionally, memory can be allocated for use with the 8088. Output is symbolic assembly language. The compiler is suitable for use in porting UNIX to the 8086.

2 Cross assembler/linker/librarian/downline loader for the 8086. Assembler input is an extension to that used by Intel. Loader output is a file in standard Intel hex format.

3 Simulator/debugger for the 8086. Capabilities include display, breakpoints, interpretive execution, as well as many others.

Host System: PDP-11 running RT-11, RSX-11M, UNIX/V6, UNIX/V7; or VAX-11 running VMS, UNIX/32V.

For additional information:

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Semi Workers Not Suffering More Health Hazards: Osha

SAN FRANCISCO — Semiconductor industry workers do not experience injury or illness rates higher than those for workers in other manufacturing industries, the California Occupational Safety and Heath Administration (Cal/Osha) has found.

However, workers in the semiconductor industry do experience a higher incidence of skin burns and irritations than workers in other manufacturing industries, a recently released report from Cal/Osha revealed.

Because the electronics industry is assuming an increasingly technological and economic significance in the U.S. — with a large proportion of workers concentrated in California — Cal/Osha in early 1980 formed a task force to study potential occupational hazards of the semiconductor industry. The fabrication of semiconductors requires frequent use of a variety of hazardous chemicals.

In 1980 some 123,000 workers were employed in California semiconductor manufacturing firms, with about 78,000 employed in the Silicon Valley area. Cal/Osha reported the "typical" fabrication worker is between 18 and 30 years of age. About 39% of the workers are female and 20% come from minority ethnic backgrounds.

Skin conditions, chemical burns and eye conditions account for more than 80% of the reported illnesses in the industry, Cal/Osha said.

Prevention Nonuniform

The general complexity of the work environment in semiconductor fabrication requires a sophisticated preventive control strategy, according to Cal/Osha. However, the commission found these strategies to be nonuniform.

"With the exception of methanol, methylene chloride, nitrogen dioxide, nuisance dust and inorganic arsenic, industrial hygiene monitoring results taken during normal processing routines were quite low," the report concluded.

The survey also found there was a definite range within the industry on the attention given to health matters.

As a result of the survey, Cal/Osha has made the following recommendations:

(Continued on Page 76)

Intel, Fairchild Say Chemicals Got Into Water

Intel Corp. and Fairchild Camera & Instrument Corp. recently disclosed that toxic chemical leaks have contaminated water supplies around Silicon Valley.

Intel said trichloroethylene (TCE) leaking from an underground holding tank may have contaminated a shallow private well located near the company in Mountain View, Calif. The well was found to have 77 parts per billion of TCE.

However, Intel noted that the contamination may not have stemmed from its leaking tanks. Other electronics plants are located in the area.

TCE was widely used as a degreaser and cleaning solvent to clean finished semiconductor chips until 1977, when it was discovered that TCE caused cancer in laboratory animals.

Intel announced the leakage had affected groundwater around underground storage tanks but did not affect public water supplies. The leak was discovered last October, when Intel was trying to sell its wafer plant. The plant, still owned by Intel, has not been in use since December 1980.

Five tanks housed in a con-

(Continued on Page 76)

Optical Disk Storage To Give Winchesters A Run for Money: IRD

By Marguerite Zientara
CW Staff

NORWALK, Conn. — Optical disk-based storage systems will command two-thirds of the U.S. market for business system disk peripheral sales by 1992, giving the Winchester disk drive market a run for its money, according to a study by International Resource Development (IRD), Inc.

The threat to Winchester technology could come as early as 1984, even though the rigid disk drive market is experiencing very strong growth right now, particularly at the very low (5¼-in.) and very high (half a G byte plus) ends, IRD reported in its study entitled "Optical Disks for Office Automation and Electronic Publishing."

Optical disk storage offers economy, extremely high storage capacities and compactness. A 12-in. optical disk can store 2G bytes of information, based on existing technology.

IRD calls optical disk's capacity "so large as almost to defy the imagination," noting, "It has been estimated that the contents of the entire National Archives could be stored on a 1,000-disk optical jukebox.

"Another estimate places at 412,000 the number of pages of text that will be able to be stored on an optical disk by 1987," IRD noted in its 171-page report. The capacity of the optical disk is important because it makes possible and cost-effective the storage of all types of data — voice, pictures and machine-readable data — on a single medium.

International Resource Development, Inc. distinguishes between videodisk and optical disk technology. Videodisk is a read-only publishing medium limited to use on standard television sets; optical disk is a read/write medium, not wedded to the television set and therefore available for applications using alphanumeric text. Computerworld *here focuses on IRD's findings concerning the computer-oriented optical disk.*

"This ends the arbitrary segregations that have been imposed on data storage and multiplies manyfold the uses that can be made of information," according to the report.

Even while storage capacities of optical disks continue to expand with time, prices will drop to a point that will seriously threaten "familiar forms" of disk storage, the study showed.

Only one optical disk has been commercially introduced to date. Evaluation disks are now available for $3,000 to $4,000

(Continued on Page 78)

TYPE OF MEDIA	QUANTITY NEEDED	COST OF MEDIA
Magnetic Disk	80 200M byte Disk Packs	$40,000
Computer Compatible Tape	90 Tapes (2,400 ft, 6,250 bit/in., 8-track)	1,350
High-Density Magnetic Tape	2,400 ft or 2-in. Tape	100
Optical Disk	One 12-in. Disk	10*

* Projected

Source: International Resource Development, Inc.

Quantities Required for Storing 10^{11} Bits of Information in Alternative Storage Media

A Simon Legree for Computers

John Beall & Company, Inc.

Recession Tightens; TI, REI Announce Layoffs

DALLAS — The recession is continuing to take its toll here as two Texas-based companies, Texas Instruments, Inc. and Recognition Equipment, Inc. (REI), announced layoffs.

Completing a difficult year for the world's largest semiconductor manufacturer, TI announced recently that 270 employees would lose their jobs because of "the general economic outlook."

The company said 130 jobs were being eliminated at its Lubbock operations, 100 jobs at its Temple plant and 40 more jobs at the Abilene facility. According to a TI spokesman, most of the employees affected were in non-manufacturing jobs.

Earlier this month, TI announced a 49% drop in net income despite a small increase (3%) in net sales. From a 1980 figure of $212.2 million, profits slumped to $108.5 million on total revenues of $4.206 billion.

Both Lubbock and Abilene plants manufacture consumer products, while the Temple plant makes distributed processing products. The company spokesman refused to comment on whether any future dismissals were planned.

He added that 270 people losing their jobs was too small a figure to warrant the company making a statement on the affair.

"We probably have more than 270 people getting sick every night," the spokesman added. TI employs 90,000 people worldwide.

REI, the Irving, Texas-based manufacturer of documentation and image processing equipment, announced that 160 employees would lose their jobs in the Dallas area in an attempt "to bring expense levels in line with anticipated revenues."

REI Projections

The company recently disclosed it expects to lose $3 million to $4 million during the current quarter, following a loss of $8.2 million in 1981.

Last November the company dismissed 170 employees because of continuing economic difficulties and last month, Jay Rodney Reese, REI's president since 1973, resigned his post.

Shares in both TI and REI fell on the New York Stock Exchange following the layoff announcements.

Osha Reports on Semi Workers

(Continued from Page 75)

• The monitoring and development of a comprehensive strategy for toxic, flammable and compressed gases should be developed, with particular attention paid to local exhaust ventilation systems.

• Greater emphasis should be placed on training for all employees, with special attention given to employee awareness of the real and/or potential hazards they face in the work environment.

• Increased attention should be paid to the assessment of the potential carcinogenity of various substances routinely used in the industry, including gallium arsenide, inorganic arsenic, phospine and other substances.

The 293-page study, "Cal/Osha Semiconductor Industry Study," is available for $5 from the agency at 525 Golden Gate Ave., Third Floor, San Francisco, Calif. 94102.

Leaks Taint Valley's Water

(Continued from Page 75)

crete vault were used to store the chemical. The tanks have since been removed from the site. Intel plans to remove the concrete vault and the earth beneath it to install a carbon filtration system to recycle and purify ground water.

Another underground leak at the San Jose plant of Fairchild, a unit of Schlumberger Ltd., contaminated a public well with the toxic chemical 1,1,1, trichloroethane (TCA). TCA is not a proven carcinogen, but does cause liver damage. TCA is also a chemical solvent but, unlike TCE, it remains in use.

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We are offering you rewarding career opportunities as a member of one of our high-calibre teams working in the following areas:

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GRAHAM MAGNETICS

Brighter Future Predicted for Commercial Videodisk

NORWALK, Conn. — Developed primarily as a mass entertainment medium, the commercial videodisk has had "much less success than its supporters hoped," according to a study by International Resource Development (IRD), Inc. (story on Page 75).

Eclipsed for home use by the simultaneously introduced video-cassette recorder (VCR), the videodisk is expected, however, to eventually have a "profound impact" on electronic publishing and to make its mark as a sales tool.

In the office, the optical disk "will combine with other automated office technologies and distributed processing to create new productivity-enhancing applications for information," the report projected.

Besides giving executives the ability to review comprehensive stored data in multimodal form via increasingly widespread executive terminals, optical disk technology will aid the secretarial work force.

"At secretarial workstations, the optical disk will be used for active archival storage and also to store voice communications and incoming mail and messages such as travel arrangements, meeting and conference notifications and agendas and the like," the report said.

In terms of the volume of bits stored, although not the number of potential purchasers, the largest potential market is for digitized telecommunications recording, according to the IRD study. The two major areas within this category are satellite communications and petroleum exploration.

Mass archival storage is another major centralized application. "There are over 4,000 large business and scientific computer systems with on-line storage capacity in excess of 2.5G bytes," the study noted. Other groups suited for such mass storage are banks, insurance companies and medical facilities.

Optical disk drive revenues will remain "at a low ebb" through 1984, IRD predicted, "although systems will be placed at that time for evaluation purposes." By 1987, their revenues will be $2 billion, soaring to $9 billion by 1992, the study forecast.

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Optical Disks Seen Strong

(Continued from Page 75)

per disk from Mountain View, Calif.-based Drexler Technology Corp. But, "Drexler is prepared to price initial quantities of production-run disks at $100, and prices of $10 per disk are foreseen when production is in full scale, no later than 1984," the report said (see chart).

Some Imperfections

In spite of its "spectacular price/performance advantages," optical disk technology is not yet the perfect storage medium, the report pointed out. Two frequently cited impediments — lack of erasability and relatively high error rates — are regarded, however, as temporary drawbacks by IRD researchers.

While Drexler calls its Drexon disk "quasi-erasable," according to IRD, technically it is not erasable at all. "Instead, each time data is recorded in a fresh track, 5% to 10% of the track area is left blank," IRD explained.

"For updating old information, this blank area is used both as a fence to block off the old information and as a pointer to direct the system to the updates," the IRD report continued, adding, "A picturesque analogy might be the difference between execution and jail."

An erasable optical disk can be expected in the 1990s. Meanwhile, there are advantages to nonerasability, IRD explained, including ensured data security. In addition, erasability reduces packing density — probably the optical medium's chief selling point.

The raw bit error rates — higher than in competitive storage media — remain a question mark in the technology. While the error rates are not a factor for image storage, they do affect the storage of machine-readable data, IRD pointed out. "Opinion differs on the ease with which the bit error rates can be lifted to acceptable levels for all applications," the study noted.

On the other hand, "The vast quantities of storage space offered by these disks will permit data to be rewritten or new data to be added, thus sidestepping these problems," the study suggested.

Another pitfall lies elsewhere, however. Because of the volumes of data stored and its nonerasability, there is "uncertainty" about whether current data base management software can manage the data stored on optical disk, IRD said.

"Unless appropriate companion data base management software can be developed," IRD observed in its report, "the [optical] disk could become the brontosaurus of the storage industry: incredibly powerful but with a pitifully small brain and therefore doomed to extinction."

While further research is needed in some areas, significant advances have been made in the technology of lasers, which are crucial to the recording and reading of data on disks. Hitachi, Ltd. and RCA Corp. have assumed leadership in the development of semiconductor diode lasers, while work on alternative media types is also progressing.

For example, Philips N.V. Gloeilampenfabrieken and RCA Corp. are studying thin metal films like tellurium and its alloys; Kodak Corp. is looking into dye polymer films; Harris Corp. is examining electrophotographic media; and Drexler is developing metal-impregnated plastic. Such work is expected to result in longer archival storage and improved recording densities.

Further details on the $1,285 report are available from IRD, 30 High St., Norwalk, Conn. 06851.

'I Think the Microwave Slow Cooker's Been Waiting in the Wings Long Enough.'

Microdata Details Future Moves To Enhance Minis, Superminis

By Jeffry Beeler
CW West Coast Bureau

SAN DIEGO — Application software, data communications and human/machine interfaces will figure prominently in Microdata Corp.'s upcoming moves to enhance its existing line of mini- and superminicomputer business systems.

Other areas occupying an important place in Microdata's short-term enhancement plans include streaming tape drive units and operating systems, according to the Irvine, Calif.-based vendor's marketing and sales Vice-President Gerald Fleming.

Speaking last week at Microdata's semiannual users group meeting, Fleming also dismissed recent reports that the impetus behind the company's latest management shake-up came from its parent organization, McDonnell-Douglas Corp.

Fleming characterized the corporate reorganization, in which five of Microdata's most senior executives lost their jobs, as part of a management consolidation and streamlining effort consistent with the firm's long-term business goals.

Proposed Enhancements

On the subject of proposed enhancements, the Microdata marketing chief stressed his company's "heavy commitment" to providing its customers with additional application programs. Some of the promised software packages will come from outside sources, while others will be developed in-house, he said.

Fleming, who addressed some 250 Microdata users during the opening day of the four-day event, stopped short of predicting when the additional software would become available, nor did he specify its target customers and applications.

Manufacturing-Oriented

But in response to a question from one of his listeners, the Microdata exec gave the strong impression that at least some of the future programs will be heavily oriented toward manufacturers. "We have targeted three or four vertical market sectors for penetration during 1982 and 1983, and manufacturing control will probably be one of them," he said.

In addition to broadening its range of available applications, Microdata plans to intensify its efforts to develop human/machine interfaces that will "make interactions between users and their systems as easy as talking in English," Fleming said.

The McDonnell-Douglas subsidiary also intends to introduce enhanced data/transmission features and foresees the development of new communications architectures as well as the addition of X.25 and local networking capabilities to its existing systems line, he added.

In answer to other questions from the audience, Fleming predicted the eventual addition of an IBM 3270 communications protocol to Microdata's supermini business system, nicknamed Sequel.

He also attempted to assure users that steps were being taken to speed and simplify the task of backing up their largest disk units.

Resolution of the disk backup problem has received the company's "highest priority," he said, and can be achieved either through revisions to Microdata's existing operating system or through the development of streaming tape units, which are due to be introduced shortly.

Ouster of Top Exec

Commenting further about the firm's much publicized management shake-up, Fleming described McDonnell-Douglas as more of a spectator in the drama than a participant.

The decision to oust the company's former president, Al Cosentino, and four of his key associates originated inside Microdata itself and was later implemented with the parent company's full blessing, he claimed.

In any event, the reorganization purportedly underscores Microdata's commitment to become a $500-million per year company by the mid-1980's. To achieve that goal, the company has recently been forced to diversify.

For years, Microdata limited its business strictly to minicomputers. Today, the firm is increasingly expanding the original scope of its activities to encompass allied product sectors like superminis and distributed processing.

This diversification, in turn, has prompted the company to integrate its various divisions and efforts under a single authority and to trim its management, Fleming said.

Prime Begins Selling Its Systems to Remarketers

NATICK, Mass. — Prime Computer, Inc. has started a remarketing program deigned to attract vendors that will add value to Prime's systems for vertical markets.

In conjunction with the new sales thrust, Prime will make available to remarketers its 450-II and top-of-the-line 850 systems. This is the first time these systems have been available to resellers, the firm noted.

Under the new selling program, authorized remarketers will have a choice of two operating systems — Primos and Information.

The availability of both operating systems enables remarketers to maximize their competitive position in selected vertical markets, said Roy Finney, director of marketing programs.

Prime's direct sales force will be cooperating in the remarketer program. "When a customer's needs are best met by a remarketer's application package, the remarketer will receive the lead from Prime's direct sales force," Finney said.

In addition to highly competitive discounts on Prime equipment, remarketers selected for the program will receive training for their sales and support personnel and business management assistance.

Prime said it will make available to its already established dealer network the same terms and equipment offered under the new remarketer program.

Supershorts

Pertec Computer Corp.'s Data Systems Division has entered into an agreement with the Sorbus Service Division of Management Assistance, Inc., to provide nationwide service in the U.S. for distributors, dealers and and users of Pertec's PCC 2000 business systems.

— — —

Avco Computer Services, Inc. of Wilmington, Mass., has been chosen by British Telecom to manage the U.S. computer center for its worldwide videotex service, Prestel.

— — —

The Systems Development Foundation of Palo Alto, Calif., awarded a $10 million grant to the Rand Corp. in recognition of Rand's role in the creation of the Systems Development Corp. 25 years ago.

Rand will use the grant as endowment funds in support of its annual budget.

— — —

Tubs (Time Utilising Business Systems Ltd.) of the UK plans to market its Cupid software in the U.S. through Consultech Marketing International of Redwood City, Calif.

— — —

Cortex Corp. has announced a joint marketing venture with Digital Equipment Corp.'s Commercial Services Industries Group to develop computer systems for the banking and services industries.

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John P. Diamond and A. Paul DeFresco have been appointed vice-presidents by the Securities Industry Automation Corp.

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The Electronics Marketing Group is the new name for the Distribution Group of Wyle Laboratories.

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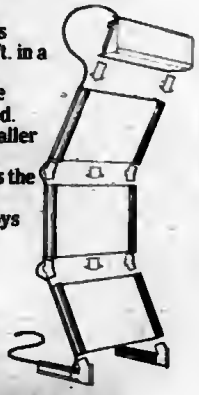

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Mergers & Acquisitions

Teodata Systems Corp. intends to sell a portion of its European marketing operations, along with rights to market Network's product line in Europe, to **Network Systems Corp.**

AGS Computers, Inc. plans to acquire **International Systems, Inc.** for AGS stock.

Information Management International, Inc. has acquired **Diversified Computer Applications** of Palo Alto, Calif. Terms of the merger were not disclosed.

The acquisition of **Insurance Systems of America, Inc.**, and the formation of an intercity communications services operating group, were announced by **United Telecommunications, Inc.**

Motorola, Inc. has filed a registration statement with the Securities and Exchange Commission for additional common stock shares to be issued in connection with its acquisition of **Four Phase Systems, Inc.**

Computer Sciences Corp. has completed its purchase of the outstanding shares of **Associated Credit Services, Inc.**, for $19.9 million.

AM International, Inc. will sell its **Jacquard Systems Division** to **Applied Technology Ventures** of Santa Ana, Calif., for an undisclosed amount.

Affiliated Computer Systems has recently purchased **The Paisano Computing Co.** for an undisclosed amount.

Twin City Etching, Inc. has been acquired by a private group and will not be part of the **Pi Companies** family owned by that group. Instead, it will be operated as a separate entity.

Lear Siegler, Inc. plans to buy **Conrac Avionic Systems Corp.** from **Conrac Corp.** for an undisclosed amount of cash.

Paradyne Corp. has announced that the acquisitions of **Ark Electronic Products, Inc.** and **Solid State Circuits, Inc.** has been completed.

New Companies

Microcobol Products, Inc. has been formed by CAP-CPP of London, offering the BOS/5 operating systems and its multiuser and networking versions to the U.S. market. It is based at Suite 540, 2471 E. Bayshore Road, Palo Alto, Calif. 94303.

System Supply is dedicated to marketing information systems and supplies at 317 Union Ave., in Stratford, N.J. 08084

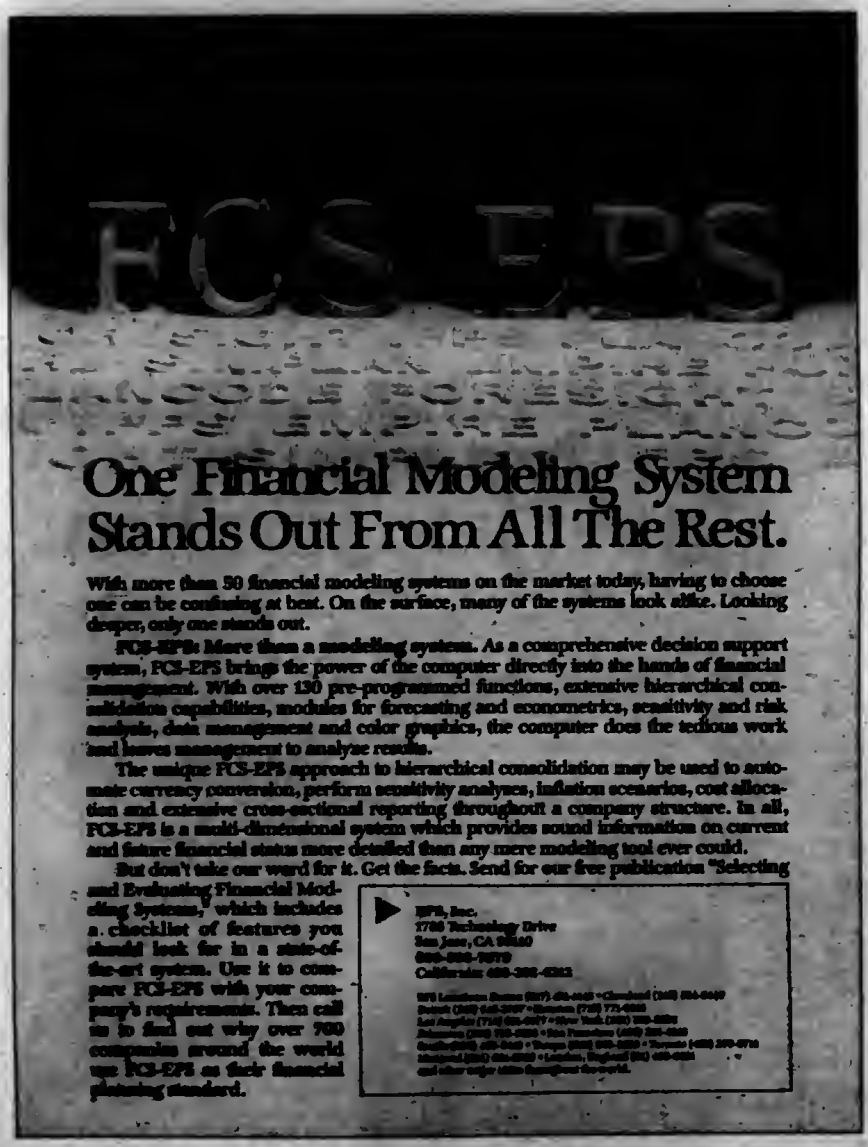
RD Labs, Inc. is specializing in the development of system-support tools for the IBM VM/370 and VM/SP operating systems, with headquarters at Suite 300, 1010 Hurley Way, Sacramento, Calif. 95825.

Thomas R. Olafsson, president of the newly formed management consulting firm called **Management Control Concepts, Inc.**, announced the opening of his firm at 124 St. Mary's St., Boston, Mass. 02215.

Comprehensive Software Design, Inc. has recently been established to provide software and consulting services to IBM System 34 and -38 users, at P.O. Box 418, Hartland, Mich. 48029.

A software development, systems management and training firm called **Cordatum, Inc.** has been established as the result of a merger between **Information & Publishing Systems, Inc.** and **Fedewa and Associates, Inc.** The new company is located at 4720 Montgomery Lane in Bethesda, Md. 20814.

Oak Industries, Inc. has formed a subsidiary, **Oak Satellite Corp.**, to consolidate and develop the company's activities in satellite communications. The company is based at 16935 W. Bernardo Drive, in Rancho Bernardo, Calif. 92127.



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HP Chip Gives Three Times Usual Density

SAN FRANCISCO — Hewlett-Packard Co. has announced a memory chip that reportedly contains 660,000 transistors on a single ¼-in. square-piece of silicon.

Introduced at the International Solid-State Circuits Conference held here recently, the new device is a random-access memory circuit and is three times as densely packed as today's commercially available circuit designs, HP claimed.

The newest chip, combined with a 450,000 transistor microprocessor device and four other chips developed by the company, forms a complete 32-bit computer system. HP said it expects to combine these devices into a computer system that will be announced in about a year.

The six-chip system can process 32 bits of information simultaneously, adding two numbers in 55 billionths of a second, the company explained.

Expansions

Honeywell, Inc. has broken ground for a new office and laboratory wing to house the Solid State Electronics Division. The 105,000 sq-ft addition is located at the Honeywell Plaza in Minneapolis.

Raytheon Co. announced plans to construct a new 80,000 sq-ft advanced microcircuit facility adjacent to the company's Andover, Mass. manufacturing plant.

Salzec Corp. has moved its corporate headquarters to 27520 Hawthorne Blvd., Rolling Hills Estates, Calif. 90274.

Zentec Corp. has leased an additional 30,000 sq-ft space in Santa Clara, Calif. to be used as a research and development facility.

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DEC Shows Its Colors in Traveling Road Show

BOSTON — Digital Equipment Corp. has kicked off a nationwide traveling road show here that is scheduled to visit 16 U.S. and Canadian cities over the next three months.

Similar presentations will also be held in 17 European cities and five locations in Asia and Australia, a DEC spokesman said.

The computer tour, officially termed "Digital Shows Its Colors," consists of a number of executive briefings, two multimedia shows and hands-on demonstrations of all of DEC's computer products. At its premiere here, the show drew about 1,000 invited guests.

In a keynote address, Rick Gimble, marketing manager of DEC's engineering systems group, told the capacity crowd that the central issue in the coming years will be how to manage the dynamics of the current "productivity decade."

As more and more people take advantage of computers — through desktop workstations and personal computers — DP vendors will have to produce more computing power for less cost. Vendors will also have to adapt to a "multivendor" scenario in which the products of different manufacturers easily interconnect to form one system, he said.

On the other hand, users who use "tactical decisions" to purchase computers — or buy a machine to solve a single problem — will have problems in the future, especially when they try to expand their information systems.

Computers can be bought on the basis of a single benchmark, "but when it comes time to link machines and systems, they will fall apart," Gimble explained.

Gimble advised users to include "strategic decisions" in their purchase plans and to pay more attention to systems, network and information architecture.

DEC's traveling road show appeared last week in Houston and will be held tomorrow in Phoenix. Other cities on the itinerary include San Diego on March 4, San Francisco on March 10 and Denver on March 19.

Additional information and a full itinerary can be obtained from DEC's product promotion and program manager at 200 Forest St., Marlboro, Ma. 01752.

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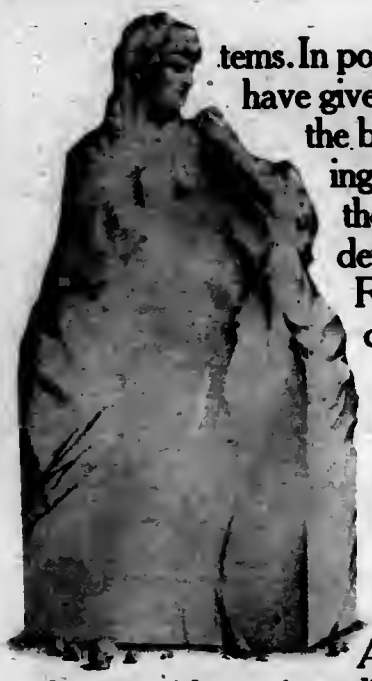

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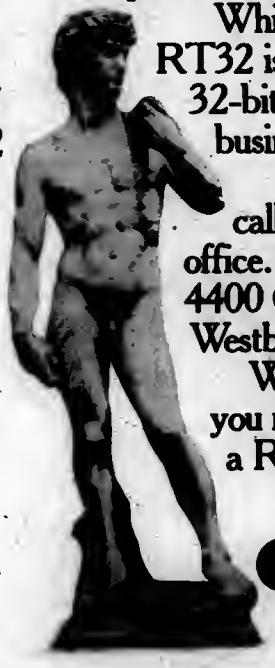

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STC Earnings Up 81% in '81

LOUISVILLE, Colo. — Storage Technology Corp. (STC) reported an 81% increase in earnings and a 53% increase in revenues for fiscal 1981. Earnings totaled $82.4 million or $2.50 per share, compared with 1980 earnings of $45.4 million or $1.72 per share.

Revenues for the year reached $922 million, up from $603.5 million a year ago.

Fourth-quarter income climbed to $32 million or 89 cents per share, a 128% increase from earnings of just over $14 million or 50 cents per share in the like quarter a year ago. Quarter revenues reached $278.1 million compared with revenues of about $185 million in the prior year.

"Our backlog of firm orders at year-end was $485 million, compared with $172 million for the previous year," STC President Jesse I. Aweida said. "This backlog growth is in spite of significant increases in our production."

Executive Corner

• A. William Perigard has been elected president of Comsat General Telesystems, Inc., a subsidiary of Comsat General Corp.

• Sidney Spiegel has been named president of the Electronics Marketing Group at Wyle Laboratories.

• C. W. Spangle has been elected an executive vice-president of Burroughs Corp.

• At Prime Computer, Inc. Joseph Cashen was named to the newly created post of vice-president, product assurance; Roland Pampel has joined the company as vice-president, engineering; and John Maske has been appointed to the newly created post of corporate vice-president, field engineering.

• Judson Goldsmith has been appointed vice-president of finance and planning at Molecular Computer.

• Tim Marshall has joined Genesis Software Corp. as vice-president.

• Robert Warren has been promoted to vice-president of research operations at IIT Research Institute.

• Daniel Tierney and Joseph Francesconi were elected corporate vice-presidents at Amdahl Corp. in charge of product support/services and marketing, respectively.

• Richard Barton has been made vice-president and manager of the Terminal Products Division at Anderson Jacobson, Inc.

• John E. Finch has been promoted to vice-president, group and corporate systems, at Informatics, Inc.

• Arthur Carr has joined the Information Systems Group at Motorola, Inc. as vice-president and general manager.

• James Storey has been named president and chief executive officer of Codex Corp.

• Inforex, Inc. has named Gerald Stanley vice-president of U.S. marketing and sales.

• Jack Mulford has been appointed vice-president and manager, employee relations operation, of General Electric Information Services Co.

• Frederick Schudel has been elected vice-president and general manager of International Memories, Inc., a division of Dorado Micro Systems.

• Corvus Systems, Inc. has appointed Douglas Broyles to the recently created post of vice-president and general manager of special products.

• David Wolverton has joined SEI Corp. as senior vice-president, management services, and Jack Spradley was named senior vice-president, operations services, at that company.

• System Industries, Inc. has promoted D. Kent Winton to senior vice-president of marketing and Richard R. Milligan to senior vice-president of operations.

• Arles E. Howell has been named vice-president and general manager of Comdial Telecommunications, Inc.

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Contracts & Pacts

Newcorp Products, Inc. has announced an agreement with Protocol Computers, Inc. to distribute and service Protocol's 1067 and 1076 Systems Network Architecture/Synchronous Data Link Control (SNA/SDLC) to Ascii converters, which enable Ascii terminals to be attached to an SNA/SDLC host computer.

Zentec Corp. has signed a $1 million contract with Cycare Systems, Inc., to supply its ZMS-35 intelligent terminals.

The U.S. Navy has awarded Planning Research Corp. a $2.8 million contract to continue its support of the Naval Intelligence Processing System.

Signal Technology, Inc. has signed an agreement with Britton Lee, Inc. to provide VAX/VMS Interface Software to Britton Lee's IDM-500 relational data base machines.

Ramtek Corp. has been awarded a contract worth $2.8 million for the use of its RM-9400 color-display generators in command and control systems manufactured by Science Applications, Inc.

Informatics, Inc. has received contracts totaling $7.6 million for the advance licensing of two software programs now under development. The Life-Comm comprehensive insurance administration software system drew $6 million of the $7.6 million.

Hewlett-Packard Co. has signed an OEM contract with Microcomputer Systems Corp. to purchase the MSC-9305 Winchester disk drive controllers for use in the HP 9134, 9135 and 9138 Winchester disk subsystems.

United Information Services, Inc. and Intercomp Resource Development and Engineering, Inc. have announced a joint marketing arrangement that provides computer services to the petroleum industry. Under the agreement, Intercomp's software will be offered to the energy industry exclusively through the computing services of United.

Harris Corp. has been awarded a three-year $30 million development contract by the U.S. Navy for work on a new satellite communications program.

In order to concentrate resources on tape and rigid-disk products, the Peripherals Division of Pertec Computer Corp. will only provide its flexible-disk products to its Triumph-Adler divisions.

Mohawk Data Sciences Corp. has been selected by four motor vehicle regulatory organizations to supply more that $8 million in distributed processing systems and software for enhancement of driver licensing and registration procedures. The orders for the MDS Series 21 came from the American Association of Motor Vehicle Administrators, the State of New Hampshire and the Canadian provinces of Alberta and Ontario.

Calculon Corp.'s Communications Systems Division has received a $3.8 million subcontract from the Systems Development Corp. under a recent award for integration and system engineering for the Switching Division of Fort Monmouth's Communications-Electronics Command Center for Communications.

Orders & Installations

M/A-Com, Inc. has received an order for four time division multiple-access earth terminals from American Satellite Corp.

Coca Cola Bottling Co. of Los Angeles has selected JIA Management Group, Inc. to manage its Corporate Systems Department and install methods and procedures to increase productivity.

POSITION ANNOUNCEMENTS

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(603) 472-8844

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Leading company in the oil & gas industry looking for an individual with IMS data base design experience. TC: [illegible]

SYSTEMS PROGRAMMER

Major upgrades and expansion of this leading firms software department has created the need for a CICS and OS systems programmer. TC: [illegible]

PROGRAMMER ANALYST

Creation of a new corporate data center has opened up several positions for individuals with IBM DOS/VSE JCL and COBOL programming ability. CICS is desired. TC:$27,100

CONTACT: John Steiger

ROBERT HALF OF DALLAS, INC [illegible]
Two NorthPark East Suite [illegible]
Dallas, Texas [illegible]

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For computer professionals with an appropriate degree and solid background in the industry. Our Communications and General Systems Division in Salt Lake City is a rapidly expanding development and manufacturing complex where our people are directly involved in a variety of activities helping us meet the needs of today and the future for programmable terminals, data communication networks, and data entry systems.

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Positions are open in Systems Programming and Microprogramming. Challenging opportunities exist in the following areas: microprocessor-based terminal operating systems, terminal handlers, high level language processors and compilers, data communication network systems, disk and file management systems, data entry systems, and design quality.

A BSCS/BSEE or similar degrees or equivalent experience required.

- TERMINAL SYSTEMS PROGRAMMING: Individuals to develop and test software for microprocessor-based programmable terminals in such areas as operating systems, communication protocols, disk and file management systems, terminal languages (both resident and cross compilers) and terminal applications products.

A BSCS or equivalent experience required.

- COMMUNICATIONS NETWORK PROGRAMMING: Candidates sought to develop and test software for communications processors in such areas as operating systems, terminal handlers, network protocols, and network management.

A BSCS or equivalent experience required.

- DATA ENTRY PROGRAMMING: Candidates will participate in various levels of development, testing, and customer support of software for several data entry product lines.

A BSCS or equivalent experience required.

- DESIGN VERIFICATION PROGRAMMING: An opportunity to work directly with other engineers and programmers in the validation of new products during the design phase. Individuals will develop design verification programs for new communications and intelligent terminal products, working in a micro/assembly/high level environment with a wide variety of hands-on experience using the latest high technology equipment.

BSCS/BSEE or equivalent experience required.

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Opportunities exist in a wide range of applications, including savings and loan, banking, accounting, payroll, personnel, cost, bill of materials, inventory control, plant floor systems and COPICS.

Our computer environment consists of an IBM 3033 operating under MVS with TSO, IMS, CICS, DL/1, PANVALET, EASTRIEVE, COBOL and ALC. Distributed processing at remote sites is provided by IBM 3270's, 3777's, 8100 DPCX and 8100 DPPX equipment supporting 3640 magnetic plant floor equipment.

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These positions offer opportunities for further professional growth and development in one of the fastest growing Sunbelt cities.

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BS in Computer Science, Business Administration or Accounting required. Minimum of 5 years of COBOL programming experience in on-line system design for business applications and/or project controls. Large scale Burroughs and data base management experience preferred.

Computer Operations
Position will support our manager of EDP operations. BS in any technical field with a minimum of 5 years experience working with Burroughs large systems required. Prefer experience in development of resource control procedures, establishing an operations documentation system, planning for hardware expansion and interfacing with application programming personnel.

Chemical Engineering Programmers/Analysts
MS in Chemical Engineering with a minimum of 2 years experience in FORTRAN or ALGOL programming required. PhD preferred. Experience in process simulations is desirable.

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BS in Computer Science with a minimum of 3 years experience in software programming and systems support functions on Burroughs 7000 series equipment required. Advanced degree and experience in the following areas preferred: patching compilers and/or MCP; performance evaluation using SMF II, WATSON and SPARK; optimization of application programs using ALGOL, FORTRAN and COBOL, and split configurations.

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IMS Performance Engineer	$40K
DBA - Total, Sys. 2000	$35-$40K

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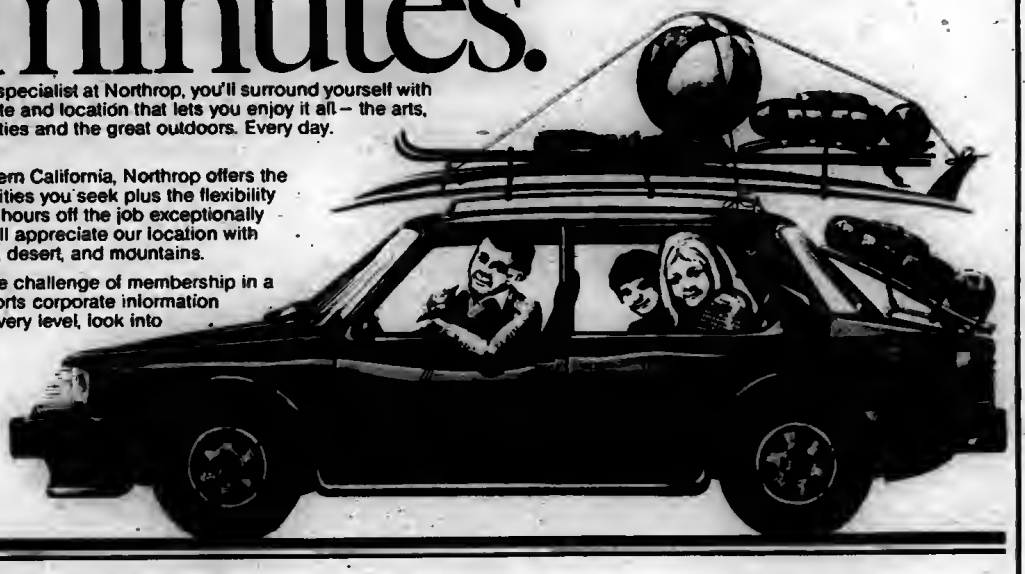

Low desert – 45 min.
High desert – 98 min.
Beaches – 10 min.
Forest – 25 min.
Mountains – 30 min.
Big mountains – 40 min.
Very big mountains – 240 min.

Skiing – 70 min.
Better skiing – 180 min.
Sailing – 15 min.
Golf – 17 min.
Running – change your shoes
Cricket – 23 min.
Disneyland – 45 min.

Hollywood Bowl – 45 min.
Universities – 30 min.
Surfing – 10 min.
Knott's Berry Farm – 45 min.
Rollerskating – change your shoes again
Universal Studios – 50 min.

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Hollywood – 40 min.
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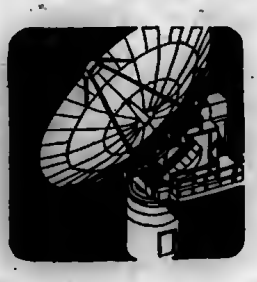
Software Engineers



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CORPORATE HEADQUARTERS

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- CICS
- IMS
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TRES Systems, Inc.

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Systems Analysts

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Responsibilities include design, development, and implementation of data processing systems. Requires a BS degree, 2-3 years programming experience, and 1-2 years systems experience.

PROJECT ANALYST II

Responsibilities include planning, organizing, and implementing specific assigned systems and projects. Requires a BS degree and several years of progressive DP experience, including experience as a senior level systems analyst.

Comprehensive salary and benefit package offered, including life, health, and dental insurance, plus a unique time-off program. Candidates may send resume to: **Saint Luke's Hospital, Human Resource Dept., 601 E. 19th Ave., Denver, Colorado 80203.** A division of Presbyterian/St. Luke's Medical Center. An Equal Opportunity Employer.

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Synercom Technology, Inc.

ASSISTANT DIRECTORS OF ACADEMIC COMPUTING
VIRGINIA COMMONWEALTH UNIVERSITY
TWO FACULTY POSITIONS

Applications and nominations are invited for Assistant Directors of Academic Computing for the Academic Campus of Virginia Commonwealth University and for the Health Science Campus (the Medical College of Virginia). The two campuses of VCU both are located in Richmond, Virginia. The Academic Campus enrolls over 17,000 students in six schools (Arts, Business, Community & Public Affairs, Education, Humanities & Sciences and Social Work), and the Health Sciences Campus enrolls over 2,700 students in six schools offering programs of study in the health sciences (Allied Health Professions, Basic Sciences, Dentistry, Medicine, Nursing and Pharmacy). VCU ranks as a comprehensive doctoral granting institution, one of three in the state of Virginia.

The Assistant Director for the Academic Campus Division has responsibility for a staff of eleven full-time and approximately 25 part-time employees providing computing facilities to a large volume of faculty and students (undergraduate and graduate users). A large part of this responsibility is in maintaining and enhancing contacts with the academic faculty so as to support their plans for instructional and research activities.

The Assistant Director for the Health Science Division supervises a staff of eleven full-time persons providing computer support for biomedical research, and instruction in health sciences. An essential part of the responsibilities includes supporting faculty involved in biomedical research.

Computing hardware available to serve the university includes two IBM 370/168 CPU's, loosely coupled; an HP-3000 series III; and a SIGMA-VI. Participation in studies concerning upgrades for these systems, and development of recommendations to the Director of Academic Computing for management of a budget of well over one million dollars are also important responsibilities.

Applicant's qualifications should include an earned graduate degree (doctorate preferred), appropriate technical background in computing (hardware, software and data communications), experience in computer applications in academic disciplines, including research and management skills. Communication skills are essential.

Salary and rank will be commensurate with qualifications and experience. Applications and nominations will be accepted until April 1, 1982 and should be sent to:

Dr. Donald L. Hartford
Director of Academic Computing
1015 Floyd Avenue
Richmond, Virginia 23284

Applications should include a curriculum vita and the names of at least three persons to whom the search committee can turn at the appropriate time for the assessments of the candidate's strengths and experience. Confidentiality requirements of candidates will be strictly observed.

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Director
Office of Management Information
Idaho State University

The Office of Management Information conducts investigative studies for the University designed to facilitate operation and decision making. The successful applicant must understand statistical and analytical procedures, measurement techniques, experience in data processing and management information systems in higher education.

The Doctorate is preferred, preferably in an evaluative or higher education field of study. Interested persons should send a letter of application, a resume and the names, addresses and telephone numbers of five references, by March 12th, 1982 to:

Dr. Clifford M. Trump
V.P. for Administration
Campus Box 8044
Idaho State University
Pocatello, Idaho, 83209.

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Candidates should have a college degree and 2-5 years experience with IBM 4341's or experience with IBM 3033. OS-MVS training is required, along with VM, DOS/VSE and CICS knowledge. Database experience would also be helpful.

Port Edwards is an attractive central Wisconsin location that offers excellent schools and abundant outdoor recreational opportunities.

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COMPUTER OPERATIONS AND SYSTEMS MANAGER

The International Livestock Centre for Africa (ILCA) is an advanced Centre for livestock research, training and documentation. It has about 60 senior scientists and other professional staff responsible for a sharply focused programme of research, documentation and training. It is supported by a variety of donor agencies through the Consultative Group for International Agricultural Research and associated donors.

A Computer Operations and Systems Manager is required, to be responsible for the planning and operations of ILCA's Computer Unit located at its HQ in Addis Ababa. This Computer Unit has a Hewlett-Packard 3000, Series 3 which is used for statistical analysis of research work, simulation modelling, documentation storage and retrieval, and administration. ILCA has research programmes in a number of African countries, and in cooperation with the Biometric Unit, data handling systems (including local microcomputers) have to be developed to ensure a fast and efficient turn around of research results under difficult communication conditions.

Duties (1) To be responsible to the day to day supervision of the operations of ILCA's Computer Unit;

(2) To participate in the further development of ILCA's computing system.

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Degree in Computer Science or equivalent plus 4-5 years experience in Operations and Systems Programming, including Fortran, and proven managerial capabilities. The appointee must be able to work in close collaboration with people of various nationalities, be English speaking and preferably competent in French.

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The Profile Group

ANALYST/PROGRAMMER 2-4 years programming IBM 370 OS/MVS Cobol, ALC, OS JCL. Panvalet, TSO, OS Dumps, Prodlibe helpful. Ability to read, develop, and code from program specs. 4 year degree or extra experience.

ANALYST/PROGRAMMER 2 years experience IBM medium to large OS/MVS, Cobol, CICS, IDMS. Heavy knowledge of on-line theory and data base preferred. Good communication skills.

SR. PROGRAMMER ANALYST 4+ years. To design and implement on-line displays and screens. Some maintenance Cobol. IBM 370 OS MVS COBOL, Easytrieve, ALC. Prefer CICS or UCF experience.

PROGRAMMER I 1+ years experience on IBM 370 prefer online experience. Cobol coding from program specs or flow chart. Good JCL knowledge essential.

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Candidates should possess a minimum of five (5) years experience in application development and two (2) project management experience. Experience in data base application, Hewlett Packard systems and structural development methodologies desired. This position will require 50% travel.

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Design and implement firmware for next generation distributed/processing systems. Includes work in micro programming, virtual machine emulation, I/O processor, system console firmware and VLSI-based systems. BSCS degree plus 1-3 years firmware design experience, assembly language programming and PASCAL required.

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Vikki Fix
Screening Committee Chairperson
Computer Science Program
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Vermillion, SD 57069

Applications received after March 15, 1982 cannot be guaranteed consideration.
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Must have B.A. degree in Computer Science and one year experience in operating IBM S/34. Must be able to program in RPG and COBOL. Programmer will be involved in programming complex software programs and working on educational career software projects. Job will involve travel. Employee will train and install project applications at various sites. Salary $1500 month.

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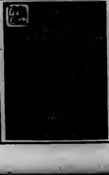

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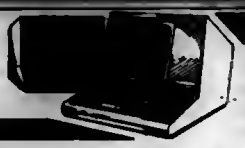

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In this position you will act as an interface with our data center customers to provide consulting support for data base applications development utilizing IDMS. You will also be responsible for providing training to customers in the use of IDMS at our facility. To qualify, candidates should have significant experience developing systems utilizing IDMS and one or more of the following teleprocessing monitors: IDMS/DC, CICS, SHADOW II. Specific IDMS/DC experience is a plus. You should be a strong user-oriented person with excellent communication skills.

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This position requires an individual to provide IDMS data base applications development support for our data center customers. To qualify, candidates should have significant experience implementing systems in a large scale IBM environment utilizing IDMS and one or more of the following teleprocessing monitors: IDMS/DC, CICS, SHADOW II. Knowledge of COBOL in an MVS environment is required.

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Computer Science Committee
MacConnell Hall
SMITH COLLEGE
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Will define business requirements for improving or replacing current systems, assure cost-effective recommendations, develop system feasibility studies and system specifications, guide and participate in systems implementation and user training, interface with various levels of management, and make formal presentations to senior management.

Position requires experience in large-scale system design, familiarity with 370/168 or 3032, 3033, 3081, and some project management experience. Very helpful to have a degree (Engineering preferred), some computer programming, TANDEM computer experience, familiarity with PL/1, EASYTRIEVE, FOCUS, COBOL, ASM, or FORTRAN. Also, familiarity with JCL, JES2, TSO, RACF, SPF, CMS, or LIBRARIAN.

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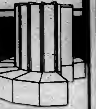

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The closing date for this position is March [illegible], 1982.

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The University of New Mexico

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Information Systems Director
Search Committee, CSB,
The University of New Mexico
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Don't let this opportunity pass you by. Put your career where it will grow quickly—the next industry leader—Agency Automation Services, Inc. Send me your resume, all inquiries will be responded to. I'm looking forward to hearing from you soon. We are an equal opportunity employer.

Sincerely,

Chris H. Scatliff
Sr. Vice President of Marketing

P.O. Box 3395 San Francisco, CA 94119

Academic Operations Manager

Academic Computing Services at The University of Wisconsin-Eau Claire is a growing department with a new Honeywell DPS 8/20 computing system. We are reopening our recruitment for an experienced person to organize and manage the operation of the computing equipment and related resources, and teach no more than one course per semester in a related academic department. Qualifications include substantial direct operations, organizational, and managerial experience; significant technical knowledge; good communication skills, and appropriate academic background. Honeywell experience and knowledge of academic environment would be valuable. Eau Claire is a city of 55,000 in beautiful Northwest Wisconsin just 90 miles from the Twin City. This full-time annual academic staff appointment begins on July 1, 1982. Salary dependent upon training and experience. Apply by March 31, 1982 to:

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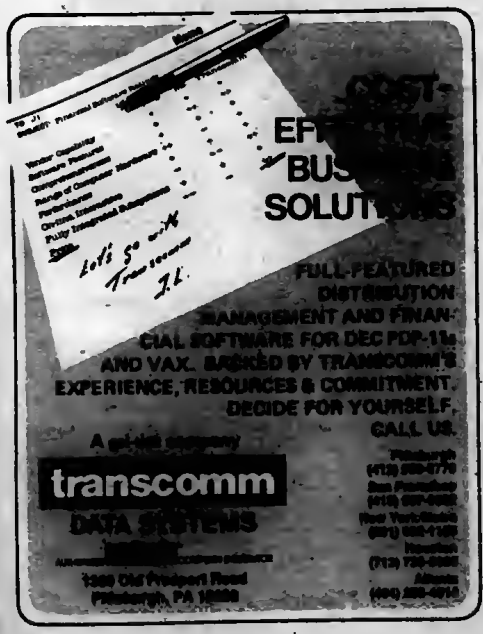

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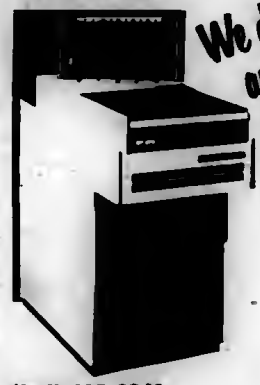

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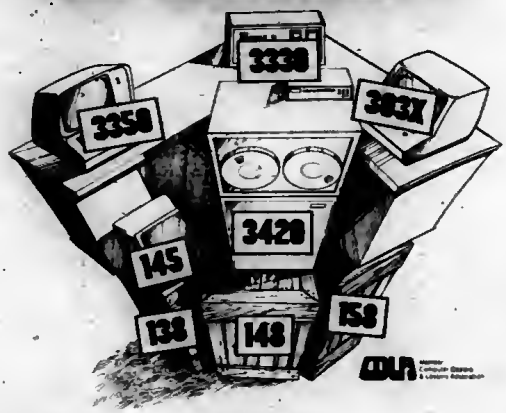

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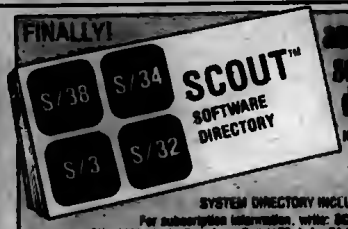

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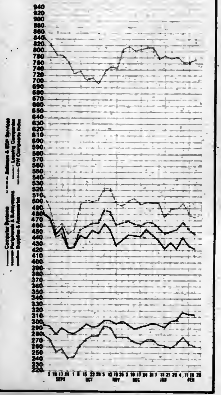

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Computerworld Stock Trading Summary

All statistics compiled, computed and formatted by TRADE QUOTES, INC. Cambridge, Mass. 02139

CLOSING PRICES WEDNESDAY, FEBRUARY 17, 1982

COMPUTER SYSTEMS

EXCH		1981-82 RANGE (1)	CLOSE FEB 17 1982	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMDAHL CORP	23- 48	27 1/4	+1	+3.8
N	BURROUGHS CORP	28- 72	34 1/8	+ 1/8	+0.3
O	COMPUTER AUTOMATION	8- 28	13 1/2	0	0.0
N	CONTROL DATA CORP	18- 42	33 1/2	- 1/8	-0.3
N	CRAY RESEARCH INC	28- 48	37 6/8	- 7/8	-2.8
N	DATA GENERAL CORP	42- 87	50 3/4	- 1/4	-0.4
N	DATAPOINT CORP	31- 68	34 3/8	+2 7/8	+9.1
N	DIGITAL EQUIPMENT	80-113	87 1/2	+1 7/8	+2.1
A	EECO INC	7- 10	7 3/8	- 1/8	-1.6
N	ELECTRONIC ASSOC.	5- 13	6 1/8	+ 1/4	+3.1
N	FOUR-PHASE SYSTEMS	18- 46	38 1/2	+1 1/4	+3.2
N	FOXBORO	37- 62	48 1/4	- 1/8	-0.3
O	FIN CRUN CONP GRP	1- 3	3/8	0	0.0
O	GENERAL AUTOMATION	6- 10	5 3/8	- 1/4	-4.2
N	HARRIS CORP	31- 50	34 1/8	+ 1/4	+0.7
N	HEWLETT-PACKARD CO	33- 34	41 8/8	+ 3/8	+0.8
N	HONEYWELL INC	63-118	73 8/8	+1 1/2	+2.0
N	IBM	48- 73	62 1/4	+ 3/8	+0.6
N	MAGNUSON COMP SYSTM	3- 32	3 7/8	-1	-20.0
N	MANAGEMENT ASSIST	8- 28	10	- 3/8	-3.8
O	MINI-COMPUTER SYST	1- 4	5/8	- 1/8	-10.0
N	MODULAR COMPUTER SYS	7- 32	7 1/8	- 1/8	-1.7
N	MOHAWK DATA SCI	11- 22	11 7/8	- 1/4	-2.0
N	NCR	38- 78	45	+1 7/8	+4.3
N	PRIME COMPUTER INC	18- 46	22 3/4	+ 7/8	+4.0
N	PERKIN-ELMER	21- 38	21 1/2	-3 1/2	-14.0
N	SPERRY CORP	30- 65	30 1/8	-1 3/8	-4.3
O	TANDEM COMPUTERS INC	13- 39	28 3/4	+ 3/4	+3.0
N	TEXAS INSTRUMENTS	71-101	79 1/4	- 3/4	-0.8
A	WANG LABS.	23- 48	27 1/2	-1 3/4	-6.8

LEASING COMPANIES

EXCH		1981-82 RANGE (1)	CLOSE FEB 17 1982	WEEK NET CHNGE	WEEK PCT CHNGE
O	BOOTHE FINANCIAL GP	18- 28	23	+ 3/4	+3.3
N	COMDISCO INC	18- 27	28	+ 3/4	+3.8
O	COMMERCE GROUP CORP	1- 3	1/2	0	0.0
O	COMPUTER INVSTRS GRP	1- 4	1/4	0	0.0
O	CONTINENTAL INFO SYS	4- 8	6 1/4	- 1/2	-8.8
O	PPF INC	8- 13	10 7/8	- 3/8	-3.3
O	ITEL	1- 18	3/4	+ 1/8	+20.0
O	LEASPAC CORP	1- 3	1/8	0	0.0
N	U.S. LEASING	18- 30	24	- 1/4	-1.0

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH; B=BOSTON; L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
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SOFTWARE & EDP SERVICES

EXCH		1981-82 RANGE (1)	CLOSE FEB 17 1982	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	2- 8	2 1/4	0	0.0
O	ADVANCED SYSTEMS INC	10- 18	13 1/2	0	0.0
O	ANACOMP INC	10- 18	10 7/8	+ 3/8	+3.6
O	ANALYSTS INTL CORP	3- 14	7	0	0.0
A	APPLIED DATA RES.	13- 25	20 6/8	- 1/8	-0.6
O	ASTRADYNE COMP IND	3- 6	3 3/4	- 1/2	-18.3
N	AUTOMATIC DATA PROC	22- 32	24 3/4	- 1/4	-1.0
O	CGA COMPUTER ASSOC	4- 28	4 3/4	- 1/4	-5.0
O	COMPUTER HORIZONS	1- 5	3	0	0.0
O	COMPUTER NETWORK	4- 8	4 1/8	- 1/4	-5.7
N	COMPUTER SCIENCES.	12- 30	13 1/2	+ 1/4	+1.8
O	COMPUTER TASK GROUP	10- 23	18 1/4	+ 1/8	+0.1
O	COMPUTER USAGE	2- 18	3 1/2	0	0.0
O	CONSERV CORP	8- 10	12 3/4	- 1/4	-1.8
O	COMSHARE	7- 21	7	- 1/4	-3.4
O	CULLINANE DATABASE	15- 37	28 3/4	- 1/2	-1.8
O	DATA DIMENSIONS INC	0- 4	3/8	0	0.0
O	DATATAB	1- 4	1 3/8	- 3/8	-21.4
O	DSI CORP	4- 8	3 1/4	0	0.0
O	DYATRON CORP	3- 11	3 1/4	- 1/8	-3.7
N	ELECTRONIC DATA SYST	18- 30	28	-1	-4.7
O	INFORMATICS INC	10- 23	18 1/4	- 1/4	-1.0
O	INTYTE CORP	1- 3	2 1/4	+ 1/4	+12.8
O	TPS COMPUTER MARKET.	1- 4	1 1/8	+ 1/8	+12.5
O	KEANE ASSOCIATES	4- 8	4	- 1/4	-5.8
A	LOGICON	23- 38	31 6/8	- 1/8	-0.3
O	MGMT SCI AMER INC	17- 25	18 1/4	0	0.0
O	MATHEMATICA INC	12- 28	28	0	0.0
O	MATHEMATICAL APP GRP	15- 28	18 1/2	- 1/8	-2.0
O	NATIONAL DATA CORP	14- 28	17 5/8	- 1/4	-1.3
N	PLANNING RESEARCH	5- 13	6 3/4	- 3/8	-5.2
O	PROGRAMMING & SYS	1- 2	1 1/8	+ 1/8	+12.0
O	REYNOLDS & REYNOLD	18- 28	18 3/4	0	0.0
O	SEI CORP	17- 28	23 3/4	- 1/4	-0.8
O	STSC INC	8- 28	8 3/4	- 1/4	-3.8
O	SCIENTIFIC COMPUTERS	7- 10	7 3/8	0	0.0
O	SOFTWARE AG	6- 23	8 3/8	+ 1/8	+1.0
N	TYMSHARE INC	18- 38	18	-1 1/4	-6.4
A	URS CORP	11- 18	13	- 1/4	-2.0
O	WYLY CORP	7- 20	7 3/8	- 1/8	-1.8

PERIPHERALS & SUBSYSTEMS

EXCH		1981-82 RANGE (1)	CLOSE FEB 17 1982	WEEK NET CHNGE	WEEK PCT CHNGE
N	AM INTERNATIONAL	3- 28	3 1/2	0	0.0
A	ANDERSON JACOBSON	10- 28	11	- 1/4	-2.3
O	AUTO-TROL TECHNOLOGY	8- 62	12	+ 1/4	+2.1
O	BANCTEC INC	20- 35	30 1/2	0	0.0
O	BEEHIVE INT'L	6- 18	8 5/8	- 1/8	-7.0
O	BOLT, BERANEK & NEW	8- 28	14 1/2	+ 3/4	+5.4
O	CAMBEX CORP	2- 8	2 1/4	- 3/8	-14.3
N	CENTRONICS DATA COMP	7- 40	11	+ 1/8	+1.1
O	CETEC CORP	4- 8	4 1/8	- 5/8	-13.1
O	COMPUTER DEVICES INC	4- 18	6 7/8	- 1/4	-3.0
O	COGNITRONICS	3- 11	3 7/8	0	0.0
O	COMPUTER COMMUN.	1- 8	4	0	0.0
A	COMPUTER CONSOLES	10- 28	18	0	0.0
O	COMPUTER TRANSCEIVER	3- 8	5 3/8	- 7/8	-14.0
N	COMPUTERVISION CORP	20- 48	28 7/8	- 1/2	-1.8
N	CONRAC CORP	17- 28	23 5/8	- 1/8	-0.8
A	DATA ACCESS SYSTEMS	2- 23	3 1/8	+ 1/4	+8.6
A	DATAPRODUCTS CORP	18- 44	10 1/8	+ 1/8	+0.6
O	DATUM INC	3- 8	1 6/8	0	0.0
O	DAVID JAMISON CARLYL	3- 7	6 1/2	- 1/4	-3.7
O	DECISION DATA COMPUT	3- 8	3	0	0.0
O	DELTA DATA SYSTEMS	2- 4	1 7/8	0	0.0
O	DATARAM CORP	6- 15	6	- 1/2	-7.6
O	ELECTRONIC M & M	3- 8	3 1/4	- 1/4	-7.1
O	EVANS & SUTHERLAND	18- 40	24 1/4	+1	+4.3
O	FABRI-TEK	2- 8	6 7/8	0	0.0
O	GENERAL COMPUTER SYS	1- 12	6 1/2	0	0.0
N	GEN'L DATA COMM IND	8- 18	8 1/8	- 1/8	-1.8
O	GENERAL TERMINAL CP	1- 4	5/8	-	-8.1
N	HAZELTINE CORP	18- 38	28 1/8	- 7/8	-3.8
O	INFORMATION INTL INC	8- 17	12 3/4	0	0.0
O	INTEL CORP	21- 61	34 3/4	+ 1/4	+1.0
O	IPL SYSTEMS INC	8- 18	7 1/4	- 1/8	-1.6
A	LUNDY ELECTRONICS	7- 18	8 1/2	- 1/4	-2.8
A	MAI DATA CORP	11- 27	18 3/4	- 1/4	-1.5
O	NETWORK SYSTEMS CORP	14- 28	17 8/8	+ 6/8	+3.6
O	ONEX	2- 12	8	-3	-37.0
N	PARADYNE CORP	25- 62	38 1/2	-1 1/2	-3.8
A	PENRIL CORP	8- 17	8 1/8	- 3/8	-4.4
O	QANTEX CORP	8- 23	14 7/8	- 1/8	-0.8
N	RECOGNITION EQUIP	4- 21	4 1/4	- 1/4	-5.6
O	SCAN DATA	1- 8	3/4	0	0.0
N	STORAGE TECHNOLOGY	18- 40	32 3/8	+ 3/8	+1.1
O	SYKES DATATRONICS	8- 34	28 1/2	- 1/2	-2.0
A	7 BAR INC	13- 18	18 6/8	+ 7/8	+5.6
A	TEC INC	4- 7	6 8/8	+ 1/8	+1.8
N	TEKTRONIX INC	48- 70	48	- 1/2	-1.8
N	TELEX	5- 8	8	+ 1/8	+6.8
O	TESDATA SYSTEMS CP	8- 17	8 3/4	0	0.0
A	TIMEPLEX INC	7- 18	7 7/8	+ 1/8	+8.7
O	WILTEK INC	1- 3	1 7/8	0	0.0

SUPPLIES & ACCESSORIES

EXCH		1981-82 RANGE (1)	CLOSE FEB 17 1982	WEEK NET CHNGE	WEEK PCT CHNGE
N	AMERICAN BUS PRODS	11- 17	11 3/4	- 1/8	-2.0
O	BALTIMORE BUS FORMS	1- 8	1 1/4	0	0.0
O	BARRY WRIGHT	15- 28	17 1/4	+1	+6.1
O	CYBERNATICS INC	1- 2	1	0	0.0
O	DUPLEX PRODUCTS INC	12- 17	18 1/2	- 1/8	-3.0
O	ENNIS BUS. FORMS	15- 23	18	- 1/4	-1.3
N	3M COMPANY	48- 63	54 5/8	- 7/8	-1.8
O	MOORE CORP LTD	27- 38	28 5/8	+ 5/8	+2.1
O	NASHUA CORP	16 32	17	0	0.0
O	STANDARD REGISTER	30- 41	33 1/4	- 1/2	-1.4
A	TAB PRODUCTS CO	18- 20	18 7/8	- 7/8	-8.2
N	WALLACE BUS FORMS	22- 38	31 1/4	+ 1/2	+1.6

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U.S. Seminars

Beachwood, OH *March 18*	Indianapolis, IN *March 10*	Phoenix, AZ *March 18*
Birmingham, AL *April 6*	Kansas City, MO *March 31*	Pittsburgh, PA *March 2*
Cambridge, MA *March 2*	Los Angeles, CA *March 5*	Portland, OR *February 24*
Charlotte, NC *March 30*	Louisville, KY *March 2*	Raleigh, NC *March 11*
Columbus, OH *April 12*	Milwaukee, WI *April 14*	Roanoke, VA *March 16*
Costa Mesa, CA *March 11*	Minneapolis, MN *April 13*	Rochester, NY *February 25*
Dallas, TX *March 25*	New Orleans, LA *March 4*	Salt Lake City, UT *March 23*
Dearborn, MI *March 25*	New York, NY *March 11*	San Mateo, CA *March 25*
Denver, CO *March 16*	Oak Brook, IL *March 12*	Seattle, WA *February 23*
Des Moines, IA *April 6*	Oak Brook, IL *April 8*	Secaucus, NJ *March 9*
Honolulu, HI *April 8*	Oklahoma City, OK *March 18*	St. Louis, MO *April 7*
Houston, TX *April 8*	Omaha, NE *March 30*	Washington, DC *March 16*
	Orlando, FL *April 20*	

International Seminars

Adelaide, Australia *March 4*	Leeds, England *March 10*
Amsterdam, Netherlands *March 10*	London, England *February 25*
Antwerp, Belgium *March 11*	Lyon, France *March 25*
Birmingham, England *February 23*	Manila, Philippines *April 1*
Brussels, Belgium *March 16*	Melbourne, Australia *February 25*
Calgary, Alberta, Canada *May 12*	Montreal, Quebec, Canada *April 6*
Canberra, Australia *February 23*	Ottawa, Ontario, Canada *March 9*
Dublin, Ireland *April 15*	Paris, France *March 24*
Geneva, Switzerland *March 30*	Perth, Australia *March 2*
Glasgow, Scotland *February 17*	Singapore *March 25*
Hong Kong *March 30*	Toronto, Ontario, Canada *March 25*
Kuala Lumpur, Malaysia *March 23*	Vancouver, British Columbia *May 20*

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